APRIL 2020
VOLUME-1
ISSUE -1

AN EDUCATIONAL QUARTERLY JOURNAL

₹ 250/-

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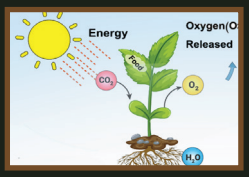
CLASS 10 CBSE

ENGLISH



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Edumate Publications, 29/B, Pocket A/3,
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EDITORIAL

Dear learners,

Learning is a continuous process, which involves thinking, articulating, storing, remembering, using, parting and so on. Everyone learns, relearns and unlearns. It becomes an asset for the life. This can never be stolen and it cannot be bought too. It can only be gained. There are lots of ways by which one attains knowledge. What one attains, becomes ornament that shines and is part of one's own life. This is what makes one's life fruitful. To be fruitful one needs to be laborious. If one has gained something through easy means that will not sustain for a long period of time. Therefore, be a learner to be productive member of the society to think, to articulate, to store, to remember, to use, to impart by equipping oneself with the required skills. Proper learning creates lot of opportunities and these would lead to dispel the ignorance and would light up knowledge.

To be a help by being by your side to make your labour easy, we are presenting our humble effort in the form of a magazine named 'EDUMATE'. This is a collective endeavour to reach to the aspirants to make the study easier and also to let you know the day to day affairs. We have tried our level best to incorporate everything required to make a student's study process easy and effective. If our efforts stand helpful for your studies then the herculean task that we started will be fruitful.

No doubt this creative endeavour will bring about an array of knowledge bearing sweetest fruit ever. Let the knowledge sown today bring forth its best fruit with the help of 'EDUMATE'.

To you from us with love…

Geo John
Chief Editor

Life ... Love... Learn... to be a Change

FR. SIJU JOHN, M.A., M.Ed.

'You must be the change you wish to see in the world', one of the perfect words of Gandhiji in this new modern fast moving world when everyone wants to perceive changes and fetch changes in the life of others but not in oneself. We call for changes in life and no one would like to be idle in his/her life. We do apply certain words often in our conversation and they are life, love and learn.

LIFE.....

"Twenty years from now you will be more disappointed by the things you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore, Dream, Discover." **– Mark Twain.**

The American writer's words about life have a lot of relevance for today's young buds. Life is to be explored in all meaning. It's not a free gift but heavily compensated by our dear parents, our visible gods on earth. Every player has a coach but the coach is not always a better player. We have to explore ourselves and to explore we need to dream and discover. Every unearthing initiate with a dream and a better dreamer discovers better. Discovery begins from within and why don't we take a step forward; a step which is rare, bold and distinctive.

LOVE .....

"Love is an untamed force. When we try to control it, it destroys us. When we try to imprison it, it enslaves us. When we try to understand it, it leaves us feeling lost and confused." **Paulo Coelho**

The Brazilian novelist says that the love is a force. The force, which comes from the heart, penetrates the hearts of others and is the germ of life. It cultivates the worth of life and our young buds have to get the imprint of this precious germ. Today the world is more educated but has less common sense, more degrees but has less capacity of judgment, bigger houses but has small families, big personalities but has less character, spends a lot but has less happiness and conquered the whole world but has lost the germ of life i.e. love. We, the human beings, try to dominate but love cultivates peace which frees us from the burden and pains of life. Let our educators, parents, peer groups, friends and so on nurture the germ of life to our young buds. We can cultivate it by giving a feather touch of love.

LEARN .....

'By three methods we may learn wisdom: First, by reflection, which is noblest; Second, by imitation, which is easiest; and third by experience, which is the bitterest.' **– Confucius**

The Chinese philosopher says that the toughest way of learning is by experience. A blind person makes a decision after experiencing. He sees the things through his heart because only his eyes are closed not his heart/mind. We have to keep our hearts open to learn by experience and learning through heart is love. The more I read, the more I acquire but the more I love, the more I learn to live. The most precious learning is learning of the meaning of love since all learning has an emotional base. We must learn to live together than leaning various languages and sciences. The standard of living is what we have but the standard of life is what we give from our heart.

BE A CHANGE .....

*"The secret of change is to focus all of your energy not on fighting the old, but on building the new."***-Socrates**

To be a change, we need to have clarity of mind and heart and this clarity is acquired through life, love and learning. In order to be a change or revolutionary one must have the vision and heart of a giraffe. Giraffe has a small, powerful, supercharged heart that is different to that possessed by other similar animals and has a holistic vision from above. We obtain speed in life by technology but the directon has to be from a heart which has knowledge by experience. Let us direct our young buds from our experienced hearts to bring changes in their life and lives to come. Therefore we shall lead a simple life but a rich burial by the triumph of our life.

GET UP FROM THE FALL TO WIN

GEO JOHN, M.A., B.Ed.

INTRODUCTION

The moment one thinks about one's own capabilities and is confident about the caliber, he/she will emerge as victorious. Success is the result of positivity. When a person is positive and is with wonderful courage to take up risks can taste triumph and when one is passive and do nothing productive will have a great fall and that would be irreversible. Being positive will make great things possible to those who don't stop believing in oneself, trying something new or better and learning to be different. Be inquisitive to be different, and if you want to be different you need to be different. Being inquisitive will open up to new ideas and these ideas will sprout, grow and yield fruits.

Be curious to win

It is necessary to be curious and curiosity according to Ian Leslie is a combination of intelligence, persistence and hunger for novelty, all wrapped up in one. In order to improve curiosity and wonder one needs to read widely and should follow one's interests. It is said that when you are running into something interesting, drop everything and study it. The feeling of being interested can act as a kind of neurological signal, directing us to fruitful areas of inquiry.

Be thirsty to accomplish your target

The thirst to have fruitful enquiry will lead to fill up and accomplish the target. It will also help one to polish mind with the minds or thoughts of others. One can always be benefitted with the progressive ideas of others. It simply means to consult with the experts to be experts. These ideas will either support or would leave the spark to think what is next. If your ideas can get wings using others' thoughts there is no wrong in it but one should make sure that it is productive and never be destructive.

Do not take up shortcuts

We have crippled ourselves in finding out shortcuts in every way possible. Though we have the potential source, we do not want to rely on anything that would demand time. Even any kind of information we require is to be available at our finger tips, if not, it is very difficult to pass moments. Today's generation is born to Google. In the era of Google searches, we have no problem finding the exact answer to our questions, but by chance likely to encounter information that is not specific or relevant to our question or queries. It is said that a serendipity deficit makes innovation harder, because innovation relies on unexpected collision of knowledge and ideas. So, it is the fact that we don't exactly get the answers perfect for our questions.

Give wings to your passions

All what you do might be meaningless or absurd for the people watch you from far, but you should never allow your passion and interests to die. Once they are no more with you, then the life will be pathetic and difficult to pursue. On the go there are chances, where you might fall down many times but your passion and interests would be your help in standing on your own foot. You must keep your passion alive and no outer forces can have access on you. This must be your strength to get up from the fall. Falling down would give us experiences and these experiences are the driving forces to stand up. An ant while carrying the grain might fall down many times but it will not stop carrying grains because of the fear of falling down. Life is similar to this. If one wants to sustain life, then it is necessary to have lots of experiences of falling down and getting up. Learn lessons from every instance of your life and this would be a force to live on.

Conclusion

I am the master of my life and everything that is required to stand on my own foot it's within me. If I am able to stand to be different by being curious to win starts my auspicious time and this so called auspicious time is within and will be out of your reach if you are to search elsewhere. Do not be satisfied with the knowledge you have but equip and update yourself at every moment by not taking the shortcuts to win rather shed your perspiration for your cause. If you are determined you will never at the place where you fell but you would fly to the heights by the wings that are created by you to win always.

MY CAREER: THE PATH FINDER

SHAJU JOSEPH, M.A,. M. Phil., B. Ed., MBA

Choosing a career after schooling is considered to be the most important activity in a student's life. But the question that baffles everybody is, **'What to choose?'** and **'How to choose?'** Unfortunately these questions remain unanswered in most of the children's lives. The reason…?

In a world where the children get everything 'readymade', this problem is bound to happen. In a world where the children are just taught about the price of things and not the value, this is bound to happen and in a world where the children are not taught to take up the responsibilities or face the challenges and stand on their own legs, this is bound to happen. The parents- especially our (Indian) parents are so concerned about their children's future that they want to have everything ready for them as they grow up and finally a high profile blue collar job with a fat six/ seven digit pay cheque. Once they achieve this – the parents are happy and content that their son/ daughter is well settled.

It looks good and everybody is fine with it. Moreover this is what 90% of the present generation wants. Gradually what happens is – they get fed up with the unending stress related to work, meeting the targets, satisfying the boss etc. In the struggle to keep up with the expectations of the employers and the society, they forget their family life, their children's social and emotional growth, the spouse, the parents and relations. Not only that the extreme stress makes the person mentally and physically tired. The rest of the life is spent going to the hospitals, eating loads of medicines as food etc. or to make things worse, he/ she may get into depression or even commit suicide.

How do these things happen? Was this what was envisioned? Was it the destiny / the life parents wanted the children to have?

No- Obviously No is the answer. Then Why …? why should this happen ? Let us look back to the two questions that we left behind – **What to choose? and How to choose?**

These two questions are quintessentially important because a choice that one makes at a critical point of time makes all the difference. Every apprentice searching for a happy life, should earnestly work on What to Choose- not choose what they have been told to by the parents , relatives or the so called well- wishers or not a career to satisfy your parents or your own social status. The choice should ultimately based on your own interests , your own passion and your own heart's desire - failing in which whatever you do will become just a job , a burden and it will never make you happy.

As we discussed, what to Choose entirely depends on your passion, love, affinity and attachment. Your parents / teachers can surely guide you or support you but make sure you be the decision maker. When you go after what you are passionate about, you are bound to enjoy what you do. It will never be a burden for you or even a 'work' for you but it will be the most interesting activity, or 'time pass' for you as you get completely involved in it. As the maxim goes 'Do what you love and Love what you do'.

In the words of Dr. A P J Abdul Kalam, 'If you do what you love, you don't need to work even a single day in your life. So it becomes imperative to make a correct choice before selecting a particular profession.'

Now let's discuss how to identify your passion, your interest or what to do with your life. I hope the following questions will help you to make the choice. Ask yourself the same/ similar questions.

- What do I enjoy doing?
- What kind of activities are fun and fulfilling for me?
- What am I good at?
- What Skills do I have to excel in what I do?
- What are my capabilities?
- What are my drawbacks and what do I do to improve upon them?
- How much time do / can I spend to sharpen my skills?
- How confident am I?
- How strong is my Intrapersonal as well as my Interpersonal skills?
- Am I willing to / able to face the challenges that emerge in this field?

If you are able to find satisfying answers to these questions, be sure that you are on the right track. Develop a strong proactive mindset and 'Never say Die' attitude and an unrelenting thirst to achieve what you value the most and it will surely make your life and you will be happy and your life will be meaningful. As Swami Vivekananda reminds us " Arise, awake and stop not until the goal is reached".

CHAPTER 1

A LETTER TO GOD

G. L. FUENTES

ABOUT THE AUTHOR

Fuentes was born on Lanzarote in the Canary Islands. He started working as a deck boy with his father when he was 10. As years passed, he worked on cargo ships out of the Cabnary Islands to Trinidad and Puerto Rico and to Spanish ports of Valencia and Sevilla to South America. Later, he migrated permanently to Cuba when he was 22. He died of cancer in Cojimar in 2002 at the age of 104.

THEME

"A letter to God" is a story of extreme faith in God. Through this story, the writer has tried to depict the invincible and insurmountable faith in God of a simple poor farmer. Lecho was a poor, honest and hard-working farmer. Hence, he wrote a letter to God and asked God to send him money.

SUMMARY

The story, "A Letter to God" by G.L. Fuentes depicts unwavering faith of a farmer in God. It begins with a farmer, named Lencho expecting for a rain shower to nourish his field of corn. He is confident that his harvest is going to yield him huge profits just like it does every year. To his utmost excitement, rainfall did happen but sooner, it turned into a hailstorm destroying his entire crop field. The damage posed a threat to the family's survival as their entire livelihood was dependent on the year's produce. Although disheartened, the family had robust belief in the almighty. Lencho, despite having worked day and night at the field, knew how to write and thus, decided to write a letter to God explaining his situation and asking for help. He went to town to post his letter addressed "To God". The letter on being noticed by the postmaster, at first amused him, but then motivated him want to do something for the farmer so as to keep his immense belief intact. He contributes from his salary and collects money from his colleagues and friends who willingly contributed for an act of charity. To his dismay, he could only collect 70 pesos which he wrapped in an envelope to make it seem like a reply from the deity. On having found the letter, the writer (Lencho) is not at all shocked, but instead, he gets angry on finding that the amount is less than what he had expected. He again writes a letter to God conveying his disappointment and distrust in the employees of the post office who he thought had stolen the remaining amount.

ORAL COMPREHENSION CHECK

Q1. What did Lencho hope for?

A. Lencho hoped for a rain shower for his crop field.

Q2. Why did Lencho say the raindrops were like 'new coins'?

A. After the rain shower, everything was going as per Lencho's plan and he had immense confidence that his harvest would yield substantial profits. Thus, he referred to the droplets as "new coins, the larger ones being equivalent to ten pesos and smaller ones, five pesos.

Q3. How did the rain change? What happened to Lencho's fields?

A. Soon after the rainfall had begun, the wind became strong leading to a hailstorm. As a result of which, Lencho's crop fields got withered, the trees had shed their leaves and the flowers had fallen.

Q4. What were Lencho's feelings when the hail stopped?

A. Lencho was extremely disheartened and his soul was filled with immense sadness.

Q5. Who or what did Lencho have faith in? What did he do?

A. Lencho had unwavering faith in God. Thus, he decided to write a letter to God conveying his grievances and asking for 100 pesos for survival and rejuvenation of crops.

Q6. Who read the letter?

A. A postman who was also an employee of the post office read the letter.

Q7. What did the postmaster do then?

A. The postmaster was amazed at Lencho's unshakeable faith in the deity and thus, to retain it, he decided to collect money for him from his friends and colleagues.

Q8. Was Lencho surprised to find a letter for him with money in it?

A. Lencho was not at all surprised on seeing the letter because this is what he was expecting. Instead, he was angry when he found that the amount was less than what he had asked for.

Q9. What made him angry?

A. Lencho was angry that there was only seventy pesos in the envelope even though he had asked for 100. He was confident that God had given him full but he was

doubtful that the post office folks would have taken it. So he was infuriated.

Q10. Who does Lencho have complete faith in? Which sentences in the story tell you this?

A. Lencho has immense faith in God. These lines are evident to this fact: "Lencho showed not the slightest surprise on seeing the money; such was his confidence - but he became angry when he counted the money. God could not have made a mistake, nor could he have denied Lencho what he had requested."

Q11. Why does the postmaster send money to Lencho? Why does he sign the letter 'God'?

A. The postmaster did not want to shake the writer's faith in the almighty, and thus, out of virtuous intentions, decided to collect money for "an act of charity". He also signed the letter in the name of God to conceal his identity as he wanted Lencho to think it was actually a reply from God.

Q12. Did Lencho try to find out who had sent the money to him? Why/Why not?

A. No, Lencho did not try to find out the sender because he was very optimistic about the existence of almighty and that, his letter is actually received and replied to, by God. It was his unshakeable faith that made him not question the identity of the sender.

Q13. Who does Lencho think has taken the rest of the money? What is the irony in the situation? (Remember that the irony of a situation is an unexpected aspect of it. An ironic situation is strange or amusing because it is the opposite of what is expected.)

A. Lencho thought that it is the postmaster or the employees of the post-office who had stolen his remaining amount, as is evident from his second letter to God where he requests the deity not to send money by mail next time. The irony here is that, it was actually the postmaster and the employees who had collected the money out of their clean intent to keep Lencho's faith intact, but are the ones who ended up getting blamed for stealing the missing amount.

Q 14. Are there people like Lencho in the real world? What kind of a person would you say he is? You may select appropriate words from the box to answer the question.

greedy, naive, stupid, ungrateful, selfish, comical, unquestioning

Lencho had an unflinching faith in God. He was never ungrateful about life even when the storm destroyed his crops. He was so naïve that he wrote a letter to God asking for some money. He was confident that God would respond. The postmaster and his team were good Samaritans too. They selflessly helped Lencho and managed to gather 70 pesos. Quite ironically, Lencho suspects that they had taken filched the rest of the money. These people were kind to Lencho but they were not as naïve and honest as he is. They had initially joked about Lencho.

Q15. There are two kinds of conflict in the story: between humans and nature, and between humans themselves. How are these conflicts illustrated?

A. The story "A Letter to God" depicts two types of conflicts; one between man and nature and the other among men themselves. In the beginning of the story, the farmer hopes for a rain shower for the benefit of his corn field. On actually receiving rain, he becomes overjoyed and starts thinking about all the profit that would come in. Not much later, his joy is turned into sorrow when the wind becomes strong leading to a hailstorm. This depicts the disagreement between man and nature wherein humans want the nature to act according to their aspirations. The second divergence arises when Lencho starts doubting the honesty of the post-office employees who actually helped him with the money anonymously. This is the conflict among men themselves, wherein, we are ready to trust in the idea of God's existence but we are not ready to trust each other.

WORDS ANEW

CREST
I could see a beautiful yellow cottage on the crest of the hill.
The waves had a shining silver crest.
Hence, crest means top of hill/ wave

DRAPED
She was looking pretty, draped in a saree.
The road was draped in snow on Christmas day.
Hence, draped means covered/clad

CONSCIENCE
My conscience told me that I should help the child on the street.
The lawyer's conscience helped him speak the truth.
So, conscience means inner sense of right and wrong

AMIABLE
Robin's neighbour was an amiable man.
His amiable nature makes him quite popular too.
So, amiable means friendly and pleasant

CONTENTMENT
The students came out of the exam hall in contentment.
There was contentment on his face when he saved the woman.
Hence, contentment means satisfaction

GRAMMAR EXERCISES

There are different names in different parts of the world for storms, depending on their nature. Can you match the names in the box with their descriptions below, and fill in the blanks? You may use a dictionary to help you.

gale, whirlwind, cyclone, hurricane, tornado, typhoon

i. A violent tropical storm in which strong winds move in a circle: __ __ c __ __ __ __

ii. An extremely strong wind : __ a __ __

iii. A violent tropical storm with very strong winds: __ __ p __ __ __ __

iv. A violent storm whose centre is a cloud in the shape of a funnel: __ __ __ n __ __ __

v. A violent storm with very strong winds, especially in the western Atlantic Ocean: __ __ r __ __ __ __ __ __

vi. A very strong wind that moves very fast in a spinning movement and causes a lot of damage: __ __ __ __ l __ __ __ __

Answers: i. Cyclone , ii. Gale, iii. Typhoon, iv. Tornado, v. Hurricane, vi. Whirlwind

Match the sentences in Column A with the meanings of 'hope' in Column B.

A	B
1. Will you get the subjects you want to study in college? I hope so.	a. a feeling that something good will probably happen
2. I hope you don't mind my saying this, but I don't like the way you are arguing.	b. thinking that this would happen (It may or may not have happened.)
3. This discovery will give new hope to HIV/AIDS sufferers.	c. stopped believing that this good thing would happen
4. We were hoping against hope that the judges would not notice our mistakes.	d. wanting something to happen (and thinking it quite possible)
5. I called early in the hope of speaking to her before she went to school.	e. showing concern that what you say should not offend or disturb the other person: a way of being polite
6. Just when everybody had given up hope, the fishermen came back, seven days after the cyclone.	f. wishing for something to happen, although this is very unlikely

Answers: 1:d, 2:e, 3:a, 4:f, 5:b, 6:c

Join the sentences given below using who, whom, whose, which, as suggested.

1. **I often go to Mumbai. Mumbai is the commercial capital of India. (which)**
   I often go to Mumbai, which is the commercial capital city of India.
2. **My mother is going to host a TV show on cooking. She cooks very well. (who)**
   My mother, who cooks very well, is going to host a TV show on cooking.
3. **These sports persons are going to meet the President. Their performance has been excellent. (whose)**
   These sports persons, whose performance has been excellent, are going to meet the President.
4. **Lencho prayed to God. His eyes see into our minds. (whose)**
   Lencho prayed to God, whose eyes see into our minds.
5. **This man cheated me. I trusted him. (whom)**
   This man, whom I trusted, cheated me.

Find sentences in the story with negative words, which express the following ideas emphatically.

1. **The trees lost all their leaves.**
   "Not a leaf remained on the trees."
2. **The letter was addressed to God himself.**
   "It was nothing less than a letter to God.
3. **The postman saw this address for the first time in his career**.
   "Never in his career as a postman had he known that address."

OBJECT	METAPHOR	QUALITY OR FEATURE COMPARED
CLOUD	Huge mountains of clouds	The mass or 'hugeness' of mountains
RAINDROPS	New coins	
HAILSTONES	New silver coins / frozen pearls	
LOCUSTS	A plague of locusts	An epidemic (a disease) that spreads very rapidly and leaves many people dead
	An ox of a man	

Answers:

OBJECT	METAPHOR	QUALITY OR FEATURE COMPARED
CLOUD	Huge mountains of clouds	The mass or 'hugeness' of mountains
RAINDROPS	New coins	The draping or covering of an area by a curtain
HAILSTONES	New silver coins / frozen pearls	The resemblance in colour and hardness to a pearl
LOCUSTS	A plague of locusts	An epidemic (a disease) that spreads very rapidly and leaves many people dead
MAN (LENCHO)	An ox of a man	The working of an ox in the fields (hard work)

LISTENING

Listen to the letter through t**he** teacher or the audio tape. As you listen fill in the table given below.

The writer apologises(says sorry) because	He hadn't written for a long time.
The writer has sent this to the reader	In the month of September 2005
The writer sent it in the month of	September 2005
The reason for not writing earlier	is because they have just moved house recently.
Sarah goes to	a playschool nearby.
Who is writing to whom	Jaya is writing to Arti.
Where and when were they last together	Bangalore, the previous year.

WRITING

Lencho suffered first due to drought and then by floods. Our country is also facing such situations in the recent years. There is flood and there is drought. There is a need to save water through water harvesting. Design a poster for your area on how to save water during summer and when it is available in excess.

- While drafting a poster. You should keep the following points in mind:
- Frame an appropriate title, include a slogan and also include only the most relevant points.
- The picture/illustration should speak for itself. It can be centrally placed or even super imposed with the content.
- Content should be held within 50 words. And should be in simple language. Use phrases and not full sentences.
- Include date and name of Issuing Authority
- Overall, the poster should be 'eye- catching.'

POEM

DUST OF SNOW

ROBERT FROST

ABOUT THE AUTHOR

Robert Lee Frost was born on March 26,1874 in San Fransisco, California, United States. He added wonderful colours to the world of literature. He secured a reputable place as a literary man with his creative and thoughtful ideas. He used literary devices that turned to visual and sensory imagery, metaphors, similes and symbolism to create a unique style. His famous poems include: "After Apple-Picking", "Fire and Ice", "Stopping by woods on a snowy evening", "The Road not Taken" etc. He was called to eternal rest on January 29, 1963.

INTRODUCTION

The poem "Dust of Snow" by Robert Frost is a simple and short poem, yet with a deeper and larger meaning. The poet explains how an act as petty as experiencing snow on one's body can brighten one's day up. The message of the poem is put into words by Robert Frost:
"Always, always a larger significance...
A little thing touches a larger thing."

Poem and Explanation

The way a crow
Shook down on me
The dust of snow
From a hemlock tree

Shook- shake
Hemlock- a poisonous tree with small white flowers

The poem is set in a scene where the poet is in a bad mood and is walking by a tree, a hemlock tree. Hemlock tree is a poisonous tree. As he passes by, a crow happens to throw some snow dust on him. Whether it falls on his head or shoulders is unknown as there is no specific mention in the poem. Also, the readers are left in doubt about the bird's specific action. Whether the crow was landing, shivering with cold, re adjusting itself on the branch or taking off, it happened to send some particles of snow upon the author. Here, the two agents of nature, the hemlock tree and the crow are signifiers of sadness and gloom just like the poet's mood was in the opening scene.

Has given my heart
A change of mood
And saved some part
Of a day I had rued.

Rued- held in regret

For reasons unknown, the author was having a terrible day. But the falling of the snow on his head lifted his mood instantly. He had already spent his day in a bad mood but the rest of it was saved by the crow and the hemlock tree. Generally, hemlock tree and crow are used for negative references but the poet used them beautifully to portray that inauspicious things can bring joy and happiness too. One must not take things for granted and should be open and accept whichever way the nature chooses to bless us.

Literary Devices

i. Rhyme Scheme- abab cdcd
ii. Alliteration- the occurrence of the same letter or sound at the beginning of adjacent or closely connected words.

The instances of alliteration are as follows-

i. Has given my heart

ii. And saved some part

iii. inversion - when the structure of a sentence is changed by the poet to create rhyme, this poetic license is called inversion. In stanza 1, inversion can be seen.

iv. assonance - the prominence of a vowel sound throughout a line is called assonance. In stanza 1, line 2 - "Shook down on me" - 'o' sound is prominent.

v. enjambment - when the same sentence continues to the next line without the use of any punctuation marks, it is called enjambment. It has been used thorughout the poem.

SUMMARY

The short poem by Robert Frost throws light upon the unimaginable healing power of nature and tiny things. From a bad mood to ill-health, there is nothing that can't be cured by nature. The author was experiencing one such bad day when a crow's movement near a hemlock tree dusted snow upon him. The snow instantly makes him happier. His day gets a lot better. Thus, the supremacy of nature as a whole made him realise how petty his problem was. The fact that hemlock tree is poisonous combined with crow being the indicator of doom and fear are used in the poem as the carriers of happiness in the life of narrator is ironical. The poet, through these objects has tried to highlight that sometimes creatures linked with negative aspects of life can be the bringer of change and happiness. Being outdoors in nature, with all it's unpredictability can benefit anyone, anywhere at any time.

Questions and Answers

Q1. **What is a "dust of snow"? What does the poet say has changed his mood? How has the poet's mood changed?**

A. "Dust of snow" refers to the tiny particles of snow. The particles are so small that poet referred to them as "dust". The poet was in an awful mood when particles of snow had fallen on him. This changed the poet's frame of mind instantly and his day got a lot better.

Q 2. **How does Frost present nature in this poem? The following questions may help you to think of an answer.**

(i) What are the birds that are usually named in poems? Do you think a crow is often mentioned in poems? What images come to your mind when you think of a crow?

A. Birds like sparrow, nightingale and peacock are more than often named in poems. Unlike these birds, crows are often seen as the indicators of doom and fear. They are often used for negative references.

(ii) Again, what is "a hemlock tree"? Why doesn't the poet write about a more 'beautiful' tree such as a maple, or an oak, or a pine?

A. Trees are also seen as mighty creatures imparting wisdom as they're too old. They give out oxygen and absorb the carbon dioxide which is connected with absorbing all the negative energy. But there are trees that are poisonous too, like a hemlock tree. The poet does not mention a more 'beautiful' tree such as maple, oak or pine because he wants to indicate a sad scene. Being poisonous, a hemlock tree is considered bad and so, he refers to it.

(iii) What do the 'crow' and 'hemlock' represent — joy or sorrow? What does the dust of snow that the crow shakes off a hemlock tree stand for?

A. Both crow and the hemlock tree represent sorrow. Frost has used both the negative creatures (crow and the hemlock tree) as the carriers of positivism and strength that transformed his day for the better. By not using birds like sparrow and nightingale and trees like maple, oak or a pine, the poet has tried to break down all the preconceived notions we have about certain agents of nature. He has tried to make us understand that we see the world not as how it is, but as how we want to see it. Thus, the crow sitting and a hemlock tree together made his day better. The dust of snow stands for joy.

POEM

FIRE AND ICE

ROBERT FROST

Poem and Explanation

Some say the world will end in fire
Some say in ice.
From what I've tasted of desire
I hold with those who favour fire.

Desire- a strong feeling of wanting to have something or wishing for something to happen

Favour- approval, support

The poem expresses the profound idea that the world would end in either of two ways, either by ice or fire. One group is of the opinion that someday the Earth's core will get so heated up that it would lead to fire destroying the earth's surface. On the other hand, the second group says that if the temperature goes down to an extent that makes life on Earth impossible, it would have the same catastrophic effect. The poet then compares fire and ice with the destructive features of human emotions; desire and hatred. He says that from what he is aware about "fiery desires", he would favour the ones who say that it would be fire. By saying so, he brings about the idea that human beings let their emotions rule them and the consequence of unmonitored longing is chaos.

But if it had to perish twice,
I think I know enough of hate
To say that for destruction ice
Is also great
And would suffice.

Perish- die
Suffice- be sufficient

Then by not waving off the first option of fire, he considers if the world has to expire twice, ice would be equally competent in ending it. He brings about a contrast between "ice" and "hatred". The human capability of insensitivity and hatred has the potential for inner destruction. Though slow and steady, it has the same effect that desire has on us. So if given an option between fire and ice, ice would be just as good as fire to destroy the world.

LITERARY DEVICES

1. Rhyming scheme- Aba abc bcb
2. Assonance- it is repetition of vowel sounds in same line. The repetition is at different places in different words.
   Example- The long sound of "o" in "I hold with those who favour fire"
3. Alliteration- alliteration is the repetition of a consonant sound at the start of two or more closely placed words.
   Example- The sound of "f" in "favour fire", "w" in "world will"
4. Imagery- Imagery is used to make readers perceive things involving their five senses. Example- "Some say the world will end in fire"
   "To say that for destruction ice Is also great"
5. Anaphora- the repetition of a word or expression at the start of two or more consecutive lines.
   Example - "Some say" is repeated at the start of lines 1 and 2.
6. Personification- Personification is to give human qualities to inanimate objects. In this poem, "fire" and "ice" are capable of destruction. Thus, the poet personifies fire and ice by giving them mind and power to destroy anything.
7. Enjambment- it is defined as the thought or clause that does not come to an end at a line break, rather it moves over to the next line.
   Example- "From what I've tasted of desire
   I hold with those who favor fire"

SUMMARY

Robert Frost's poem "Fire and Ice" is a strong symbolic poem where fire is used as the emotion of desire and ice, that of hatred. He has used the idea of two groups who have their own possible explanation for the end of the world. One is of the opinion that fire alone, can destroy each and every possibility of life on Earth while the other thinks that if ice as a result of extreme low temperatures could cover the earth's surface, it would lead to the end of the world. Both the components are compared with self-destructing human emotions: desire and hatred. The poet is originally of the opinion that he has been very closely associated with the "fiery desires" and considers it capable of bringing human beings on the verge of destruction. Thus, he considers fire as more competent for destruction. But then he thinks that "icy hatred" is just as capable of ruining humans, though slowly and steadily. Therefore, if Earth was to end twice, ice would be just as good as fire. If fire would lead to rapid destruction, ice would lead to silent damage. Similarly, if fire is pure passion, ice is pure reason. Thus, the poem, very artistically, underpins the philosophy that we let our emotions rule us and if don't control them they will surely bring us all on the verge of chaos.

ENGLISH
FOOT PRINTS

CHAPTER 1

A TRIUMPH OF SURGERY

JAMES HERRIOT

ABOUT THE AUTHOR

James Alfred Wight, known by the pen name James Herriot, was British veterinary surgeon and writer. He was born in Sunderland, England on October 3, 1916. His books are partially autobiographical, with many of the stories loosely based on real events or people. He died on February 23, 1995 at the age of 78.

IN A NUTSHELL

This is an endearing tale about Mrs Pumphrey and her pet dog Tricki. Their inseparable bond and deep love for each other surfaces out in the story reminding us of the age-old belief that dog is man's best friend. Tricki's lack of energy troubles Mrs. Pumphrey to such an extent that she thought he was probably malnourished and so she decides to give him extra meals and supplements, even some wine and brandy too. The result is that Tricki bloats into a bag of flesh and is barely able to move. His obesity is noticed by Mr. Herriot, the veterinary surgeon who insists that Tricki be sent to him for treatment. His magical remedy for the dog was nothing but a lot of fluids and playtime with the rest of the dogs. In no time Tricki turns into an agile and healthy dog. Mrs Pumphrey says that Tricki's good health is a triumph of surgery probably because she believes that Mr. Herriot had given him a proper medical treatment.

READ AND FIND OUT:

Q 1. Why is Mrs Pumphrey worried about Tricki?

Ans. Mrs. Pumphrey is worried about Tricki because he seemed to have no energy at all.

Q 2. What does she do to help him? Is she wise in this?

Ans. Thinking that tricky is probably malnourished, she started giving him extra meals and supplements which made him bloat quite a lot.

Q 3. Who does 'I' refer to in this story?

Ans. I' in this story is Mr. Herriot, the veterinary doctor who has been treating Tricki now and then.

Q 4. Is the narrator as rich as Tricki's mistress?

Ans. No, the narrator, Mr. Herriot is not as rich as Tricki's mistress.

Q 5. How does he treat the dog?

Ans. His plan for Tricki was quite simple, give him plenty of fluids, cut down on his diet seriously and let him play around with the other dogs thereby increasing his physical activity.

Q 6. Why is he tempted to keep Tricki on as a permanent guest?

Ans. He is tempted to keep Tricki as a permanent guest because in a short period of time Tricki reigned his health and he knew that Mrs. Pumphrey would overfeed and pamper tricks so much that his health would deteriorate again.

Q 7. Why does Mrs. Pumphrey think the dog's recovery is "a triumph of surgery"?

Ans. Mrs Pumphrey thinks that Tricki's recovery is "a triumph of surgery" because she is ignorant of the fact that Tricki was overfed and so obese. She still believes that Tricki was really sick and that Mr. Herriot has given him ample medical care.

WORDS ANEW

LISTLESS

Mrs Pumphrey was worried about Tricki's listless behaviour.

The boy selling keychains on the street looked listless.

REGIME

Sportsmen usually have a very strict regime to follow.

The actress followed a new regime to lose a few pounds for her character in the film.

DISTRAUGHT

The distraught mother carried the injured child to the hospital.

The child was distraught when her toy was broken.

SCRIMMAGE

The little girls scrimmaged in the bush for the ball.

I saw my daughter scrimmage in the cupboard for some important paper.

CONVALESCING

The athlete was convalescing at a good pace after the injury.

The doctor was happy to see the young patient convalescing from his cancer.

LITHE

The pole- vaulter was so lithe that he made a new record. The lead dancer was lithe and graceful.

THINK ABOUT IT

Q 1. What kind of a person do you think the narrator, a veterinary surgeon, is? Would you say he is tactful and full of common sense?

Ans. The narrator, Mr. Herriot, a veterinary surgeon is a completely dedicated professional. He is very keen on his patient's health. When ssshe saw Tricki's obesity, he was simply not happy. He was also careful not to hurt Mrs. Pumphrey's feelings as he knew how much she doted upon Tricki. So, very cleverly, he managed to remind Mrs. Humphrey that Tricki needs a strict diet and a lot of exercise. This proves that he was tactful as well as full of common sense.

Q. 2. Do you think Tricki was happy to go home? What do you think will happen now?

Ans. Yes of course Tricki was very thrilled to go back home as he knew his much Mrs. Pumphrey loved him. Tricki may unfortunately bloat all over again because of Mrs. Pumphrey's fussy ways. Lest his diet and exercise is taken care of seriously, he should bloat like a sausage again.

Q. 3. Do you think this is a real-life episode, or mere fiction? Or is it a mixture of both?

Ans. This story can be a real life episode because there are people who fuss over their pets so much that they end up bloating them. It can also be a mixture of both because doctors like Mr. Herriot are quite hard to find these days.

CHAPTER 2

THE THIEF'S STORY

RUSKIN BOND

ABOUT THE AUTHOR

Ruskin Bond is an Indian author of British descent. He lives in Mussoorie. He was born on May 19, 1934. He grew up in Jamnagar (Gujarat), Dehradun, New Delhi and Shimla. He received the Sahitya Akademi Award for English writing in India in 1993, the Padma Shri in 1999, and the Delhi government's Lifetime Achievement Award in 2012.

IN A NUTSHELL

As the title suggests this is a touching story of a young thief, barely 15 years old who was accustomed to a life of pilferage. His target this time was Anil, a 25-year-old writer who seemed quite easy-going, kind and simple, just the kind that he wanted. Anil is easily moved by the little boy's innocent talk and sweet smile and allows him to stay with him as a help. The condition was that he wouldn't be given any money (as Anil had a meagre income) but food, a roof over the head and most importantly, lessons on how to read and write. Life was pleasant for the boy with barely any tough chores to do. He had managed to steal a penny or two out of the money he was given to buy grocery. Anil used to write for magazines and this time he had brought home bundle of notes he was paid. The boy felt it was right time to get back to his trade. In the middle of the night, he stole the money and ran to catch the train to lucknow but something inside stopped him and he returned to Anil and kept the damp notes (since it was raining heavily) under his pillow. The next morning, although the notes were still wet, Anil did not act as if he knew about it instead he treated him normally compelling the little boy to think about his own act of betrayal. He knew that Anil wouldn't be worried about the money but he would be sad about the broken trust.

READ AND FIND OUT

Q 1. Who does 'I' refer to in this story?
Ans. 'I' refers to the narrator who is a 15 year old boy, a thief.

Q 2. What is he "a fairly successful hand at"?
Ans. He claims to be good at what he does ie; to rob others. Hence, practice of doing so has made him "a fairly successful hand" at his craft.

Q 3. What does he get from Anil in return for his work?
Ans. He gets food, a roof over his head and most importantly, he gets to learn how to read and write.

Q 4. How does the thief think Anil will react to the theft?
Ans. The thief knew that Anil was a good soul who trusted a complete stranger like him. He was neither greedy nor rich. Anil would be really sad when he discovers that he has been robbed not because he has lost the money but because his trust has been broken.

Q 5. What does he say about the different reactions of people when they are robbed?
Ans. From all the experience he has gathered so far, the thief knew that, on being robbed, the greedy man showed fear; the rich man showed anger; and the poor man showed acceptance.

Q 6. Does Anil realise that he has been robbed?
Ans. Yes, Anil realises that he has been robbed as the currency notes were still damp.

WORDS ANEW

FLATTERY
The valiant King did not like flattery at all.
The politician was very vulnerable to flattery.

MODESTLY
She was dressed modestly at the National Award Ceremony.
Please remember to behave modestly in the presence of elders.

GRUNTING
The bear was grunting loudly in pain when it got hurt.
The beast grunted inside his cave.

APPEALING
The movie was quite appealing to the audience.
Her piano performance was very appealing.

THINK ABOUT IT

1. What are Hari Singh's reactions to the prospect of receiving an education? Do they change over time? What makes him return to Anil?

Ans. Hari Singh knows how important being educated is. His life of squalor and petty crime has only isolated him from the society. He also knows that education can bring him glory and earn him respect one day. His reactions to the prospect of receiving an education are very positive throughout the story. He was grateful that Anil was teaching him. He was excited about learning to write whole sentences because then he would be a clever and respected man. Although Anil did not pay him, he took care of him well- his meals, a roof over his head and above all, teach him to read and write. This selfless act probably touched his heart and so, in deep regret, he returns to Anil.

2. Why does Anil hand the thief over to the police? Do you think most people would have done so? In what ways is Anil different from such employers?

Ans. Anil does not hand the thief over to the police because he is a benevolent man who lives a simple and selfless life. He would rather give him a second chance than punish him. By forgiving him, Anil has taught the thief a good lesson for life. Of course, most people would have handed the thief over to the police. But Anil is different because he is a fine human being who reaches out to others and does not judge anyone whatsoever. He is kind and forgiving.

CHEMICAL REACTIONS AND EQUATIONS

TOPICS

- Introduction
- Chemical reaction
- Chemical equation
- Balanced chemical equation
- Types of chemical reaction
- Corrosion
- Rancidity

INTRODUCTION

Most of the substances around us undergoes various changes. Some of these changes are temporary with no new substance being formed, which may be physical change or chemical change. Whenever chemical change occurs, we can say that a chemical reaction has taken place. In this chapter we will learn about the chemical reaction, types of chemical reactions, chemical equation, how to balance the chemical equation and about the effects of oxidation reactions in everyday life.

CHEMICAL REACTION

Chemical reaction is the process by which two or more substances react with each other to form new substances with different properties.

Characteristics of chemical reactions

(i) Change in state

(ii) Change in colour

(iii) Evolution of gas

(iv) Change in temperature

CHEMICAL EQUATION

A chemical equation is the symbolic representation of a chemical reaction in the form of symbols and formulae, wherein the reactant entities are given on the left-hand side and the product entities on the right-hand side.

Magnesium + oxygen → magnesium oxide

(Reactant) (Product)

BALANCED CHEMICAL EQUATION

The chemical equation that shows the chemical reaction needs to be balanced. A balanced chemical equation occurs when the number of the atoms involved in the reactants side is equal to the number of atoms in the products side.

$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$

$3Fe\ (s) + 4H_2O\ (g) \rightarrow Fe_3O_4\ (s) + 4H_2\ (g)$

TYPES OF CHEMICAL REACTIONS

1) Combination reaction: A single product is formed from two or more reactants is known as a combination reaction.

CaO (s) + H2O (l) → Ca(OH)2 (aq)

Calcium oxide reacts vigorously with water to produce slaked lime (calcium hydroxide) releasing a large amount of heat.

2) Exothermic reaction: An exothermic process releases heat, and causes the temperature of the immediate surroundings to rise. The rice, potatoes and bread we eat contain carbohydrates. These carbohydrates are broken down to form glucose. This glucose combines with oxygen in the cells of our body and provides energy. The special name of this reaction is respiration is an exothermic reaction.

$C_6H_{12}O_6\ (aq) + 6O_2\ (aq) \rightarrow 6CO_2 + 6H_2O\ (l)$ + energy

(glucose)

3) Endothermic reaction: An endothermic process absorbs heat and cools the surroundings. The decomposition of vegetable matter into compost is an example of an endothermic reaction.

4) Decomposition reaction: When a single reactant breaks down to give simpler products, it is called a decomposition reaction.

White silver chloride turns grey in sunlight. This is due to the decomposition of silver chloride into silver and chlorine by light.

5) Displacement reaction: Displacement reaction is a chemical reaction in which a more reactive element displaces a less reactive element from its compound. Both metals and non-metals take part in displacement reactions. Reaction of iron nails with copper sulphate solution.

$Fe(s) + CuSO_4\ (aq) \rightarrow FeSO_4(g) + Cu\ (s)$

$Pb(s) + CuCl_2\ (aq) \rightarrow PbCl_2(aq) + Cu\ (s)$

6) Double Displacement reaction: A double displacement reaction, also known as a double replacement reaction or metathesis, is a type of chemical reaction where two compounds react and the positive ions and the negative ions of the two reactants switch places forming two new compounds or products.

7) Redox reaction: An oxidation-reduction (Redox) reaction is a type of chemical reaction that involves transfer of

electrons between two species. An oxidation-reduction reaction is a chemical reaction in which the oxidation number of a molecule, atom, or ion changes by gaining or losing electrons.

Oxidation: This process involves gain of oxygen or loss of hydrogen.

Reduction: This process involves gain of hydrogen or loss of oxygen.

Oxidizing Agent

It is the substance which gives oxygen or gains hydrogen. Or it is the substance which is reduced itself and oxidizes other.

Reducing Agent

It is the substance which gives hydrogen or gains oxygen or it is the substance which is oxidized itself and reduces other. Oxidation is the process which involves loss of electrons but reduction is the process which involves gain of electrons.

CORROSION

The process of slow conversion of metals into their undesirable compounds due to their reaction with oxygen, water, acids, gases etc. present in the atmosphere is called corrosion.

Rusting – Iron when reacts with oxygen and moisture forms red substance called rust.

RANCIDITY

Rancidity is the development of unpleasant smells in fats and oils, which are often accompanied by changes in their texture and appearance. The taste and odour of food materials containing fat and oil changes when they are left exposed to air for a long time. This is called rancidity. It is caused due to oxidation of fat and oil present in food material. There are two types of rancidity: Hydrolytic and Oxidative rancidity (auto-oxidation)

MULTIPLE CHOICE QUESTIONS

Q1. A Chemical reaction has taken place in which of the following process.

a. Ice melts into water.
b. A wet shirt got dried in sunlight.
c. A brown layer is formed over iron rod kept in air.
d. Sugar getting dissolved in water.

Ans. c. A brown layer is formed over iron rod kept in air

Q2. Which of the following is not a chemical reaction

a. Formation of salt solution
b. Grapes ripening
c. Food get digested in our body
d. Burning of match stick

Ans. a. Formation of salt solution

Q3. A chemical reaction has taken place can be represented by which of the following conditions.

a. Evolution of gas
b. Heat released
c. Change in colour
d. All the above

Ans. d. All the above

Q4. A chemical equation properly written has which of the following features.

a. Temperature required
b. Should be balanced
c. Should have information regarding physical states
d. All the above

Ans. d. All the above

Q5. A chemical equation should be balanced to

a. Display conservation of energy
b. Display conservation of mass
c. To make equation attractive
d. All the above

Ans. b. Display conservation of mass

Q6. An unbalanced chemical equation is equation written in

a. Skeletal form
b. Proper form
c. Simple form
d. Unorganized form

Ans. a. Skeletal form

Q7. A chemical equation is said to be balanced if number of

a. Compounds are same on both side
b. Molecules are same on both side
c. Number of atoms are same on both side
d. Number of electron are same on both side.

Ans. c. Number of atoms are same on both side

Q8. When magnesium is burnt in air then

a. Magnesium is reacting with oxygen
b. Magnesium is reacting with nitrogen
c. Magnesium is reacting with carbon
d. Magnesium is reacting with carbon dioxide

Ans. a. Magnesium is reacting with oxygen

Q9. Write values of a, b and c if following chemical reaction is balanced.

$$aH_2 + bO_2 \rightarrow cH_2O$$

a. a = 2, b = 1, c = 2
b. a = 1, b = 1, c = 2
c. a = 2, b = 2, c = 1
d. a = 1, b = 2, c = 2

Ans. a. a = 2, b = 1, c = 2

10. Write values of a, b, c if following chemical reaction is balanced.

$$a\,Mg + bO_2 \rightarrow cMgO$$

a. a = 1, b = 2, c = 2
b. a = 2, b = 1, c = 2
c. a = 2, b = 2, c = 2
d. a = 1, b = 2, c = 1

Ans. b. a = 2, b = 1, c = 2

Q11. Write values of a, b, c and d so that following Chemical equation is balanced

a Al + b HCl_2 → C Al Cl_3 + dH_2

a. a = 1, b = 3, c = 1, d = 3

b. a = 2, b = 6, c = 2, d = 2

c. a = 2, b = 6, c = 2, d = 3

d. a = 2, b = 3, c = 2, d = 3

Ans. c . a = 2, b = 6, c = 2, d = 3

Q12. Which of the following reactions satisfies this condition.

Iron nail kept with dilute sulphuric acid, ferric sulphate solution is formed and hydrogen gas is released.

a. 2 Fe(s) + 3 $H_2SO4(I)_2$ → $Fe_2(SO_4)_3$ (1) + $3H_2(g)$

b. $2Fe(s) + 2H_2SO_4(aq)_2 \rightarrow Fe_2(SO_4)_3(s) + 4H_2(g)$

c. $2Fe(s) + 2H_2SO_4(aq) \rightarrow 3Fe_2(SO_4)_3(aq) + 2H_2(g)$

d. $2Fe(s) + 2H_2SO_4(aq) \rightarrow Fe_2(SO_4)_3(aq) + 3H_2(g)$

Ans. d. $2Fe(s) + 2H_2SO_4(aq) \rightarrow Fe_2(SO_4)_3(aq) + 3H_2(g)$

Q13 LPG gas which we use in our home is basically butane gas (C4H10) it is burnt in presence of air. This is an exothermic reaction and energy released is used to cook. Carbon dioxide gas and steam is product for this reaction which of the following represents proper chemical equation for this process

a. $C_4H_{10}(g) + 3O_2(g) \rightarrow 4CO_2(g) + 5H_2O(i)$

b. $2C_4H_{10}(g) + 11O_2(g) \rightarrow 7CO_2(g) + 10H_2O(g)$

c. $2C_4H_{10}(g) + 11O_2(g) \rightarrow 7CO_2(g) + 10H_2O(g)$

d. $2C_4H_{10}(g) + 13O_2g \rightarrow 8CO_2(g) + 10\ H_2O(g)$

Ans. d. $2C_4H_{10}(g) + 13O_2g \rightarrow 8CO_2(g) + 10\ H_2O(g)$

Q14. The main component of Biogas is methane (CH4). It burns to generate energy. The carbon dioxide gas and water in gaseous form is obtained as product of combustion of methane. Which of the following represents the chemical reaction properlya. $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$

b. $2CH_4(g) + 4O_2(g) \rightarrow 2CO_2(g) + 2H_2O(g)$

c. $2CH_4 + 3O_2(g) \rightarrow CO_2 + 2H_2O(g)$

d. $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O(g)$

Ans. a. $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$

Q15. Calcium oxide react with water to form calcium hydroxide. Which of reaction is this.

a. Combination and endothermic reaction

b. Combination and exothermic reaction

c. Decomposition and Endothermic reaction

d. Decomposition and exothermic reaction.

Ans. b. Combination and exothermic reaction

Q16. Combustion of methane gas is

a. Exothermic reaction

b. Endothermic reaction

c. Combination reaction

d. Both (a) and (b)

Ans. a .Exothermic reaction

Q17. What kind of reaction respiration is

a. Exothermic

b. Endothermic

c. Decomposition

d. Both (a) and (b)

Ans. a. Exothermic reaction

18. A smell of burning sulphur is obtained when ferrous sulphate is heated. Why?

a. Evolution of Sulphur dioxide

b. Formation of ferric oxide

c. Formation of ferrous sulphate

d. None

Ans. a. Evolution of Sulphur dioxide

19. Which of the following is/are uses of calcium carbonates?

a. White washing

b. Marble manufacturing

c. Building material

d. All

Ans. d. All

Q20. On thermal decomposition of lead nitrate, nitrogen dioxide gas is evolved. How can its presence be verified?

a. It will turn lime water milky

b. Rotten egg odour

c. Brown fumes can be observed.

d. Reddish fumes is observed.

Ans. c. Brown fumes can be observed

Q21. After two or three days of white washing 'it' give shiny finish to the wall. What is 'it'?

a. Calcium hydroxide

b. Carbon dioxide

c. Calcium carbonate

d. Calcium hydroxide

Ans. c. Calcium carbonate

Q22. Formation of water from H2(g) and O2(g) is

a. Combination reaction

b. Decomposition reaction

c. Endothermic reaction

d. Exothermic reaction

Ans. a. Combination reaction

Q23. The decomposition of vegetable in to compost is

a. Endothermic reaction

b. Exothermic reaction

c. Combinations reaction

d. both (b) and (c)

Ans. d. both (b) and (c)

Q24. Heating of lead nitrate and emission of nitrogen dioxide is

a. Combination reaction

b. Exothermic reaction

c. Endothermic reaction

d. Thermal decomposition

Ans. d. Thermal decomposition

Q25. Iron nail dipped in copper sulphate solution to form iron sulphate and copper is

a. Combination reaction
b. Decomposition reaction
c. Displacement reaction
d. Double displacement reaction

Ans. c. Displacement reaction

Q26. An oxidation reaction takes places in which of the following process?

a. Respiration
b. Rusting of iron
c. Making compost
d. Electrolysis of water

Ans. b. Rusting of iron

Q27. Balance the following chemical equation :

$Fe + H_2O \rightarrow Fe_3O_4 + H_2$ is

a. Fe + 4H2O→ Fe3O4 + H2
b. Fe + 4H2O → Fe3O4 + 4H2
c. 3Fe(s) + 4H2O(g) → Fe3O4(s) + 4H2(g)
d. $3Fe + 4H_2O \rightarrow Fe_3O_4 + H_2$

Ans. c. $3Fe_{(s)} + 4H_2O_{(g)} \rightarrow Fe_3O_4(s) + 4H_2(g)$

Q28. An example of combination reaction is

a. Burning of coal
b. Formation of water
c. Formation of slaked line
d. All

Ans. d. All

Q29. A redox reaction is

a. MnO2 + 4HCl → MnCl2 + 2H2O + Cl2
b. Zn + CuSO4 → ZnSO4 + Cu
c. CaCO3 → CaO + CO2
d. None

Ans. a. $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

Q30. What happens when dilute hydrochloric acid is added to iron filling? Tick the Correct answer.

a. Hydrogen gas and iron chloride are produced
b. Chlorine gas and iron hydroxide are produced
c. no reaction take place
d. Iron salt and water are produced

Ans. a. Hydrogen gas and iron chloride are produced

Q31. Which of the statements about the reaction below is correct ?(NCERT solutions)

$2PbO(s) + C(s) \rightarrow 2Pb(s) \rightarrow CO_2(g)$

a. Lead is getting reduced
b. Carbon dioxide is getting oxidized
c. Carbon is getting oxidized
d. Lead oxide is getting reduced

(i) (a) and (b)
(ii) (a) and (c)
(iii) (a), (b) and (c)
(iv) all

Ans. (i) (a) and (b)

Q32. Fe2O3 + 2Al → Al2O3 + 2Fe

The above reaction is an example of (NCERT Solution)

a. Combination reaction
b. displacement reaction
c. decomposition reaction
d. displacement reaction

Ans. d. displacement reaction

Q33. What happens when dilute hydrochloric acid is added to iron filling? Tick the correct answer.

a. Hydrogen gas and iron chloride are produced.
b. Chlorine gas and iron hydroxide are produced
c. No reaction take place
d. Iron salt and water produced

Ans. a. Hydrogen gas and iron chloride are produced

Q34. Write the values of a, b, c and d if following chemical reaction is balanced

a $Pb(NO_3)_2 \rightarrow bPbO + cNO_2 + dO_2$

a. a = 2, b = 1, c = 2, d = 4
b. a = 2, b = 2, c = 1, d = 4
c. a = 2, b = 2, c = 4, d = 1
d. a = 4, b = 2, c = 1, d = 2

Ans. c. a = 2, b = 2, c = 4, d = 1

Q35. Chips manufacturer usually flush bag of chips with gas 'X'. Name the 'X'.

a. Oxygen b. Hydrogen
c. Nitrogen d. Carbon dioxide

Ans. c. Nitrogen

II. Fill in the blanks

1. …… is formed due to the reaction between magnesium and oxygen.

Ans. Magnesium Oxide

2. A …….. represents a chemical reaction.

Ans. Chemical equation

3. $C6H12O6 (aq) + 60_{2\,(aq)} \rightarrow$ ……

Ans. $6CO_2(aq) + 6H_2O(l) + Energy$

4. The carbohydrates are broken down to form ……

Ans. Glucose

5. …… is called quick lime

Ans. Calcium oxide

6. Silver chloride turns grey in sunlight to form ……

Ans. Silver metal

7. Reaction in which energy is absorbed are known as …….

Ans. endothermic reaction

8. ……. And…… are more reactive element than copper

Ans. Zinc and lead

9. ……. that produces a precipitate.

Ans. Precipitation reaction

10. Silver chloride and silver bromide decomposed in the presence of sunlight. This reaction is used in …….

Ans. Black and white photography

11. $CuO + H_2 \xrightarrow{\text{heat}} Cu + H_2O$ is a …….. reaction.

Ans. redox reaction

12. …….. causes damage to car bodies.

Ans. Corrosion

13. ……. represents the reactant, products and their physical state symbolically.

Ans. Chemical Equation

14. ……. is used in the manufacture of cement.

Ans. Calcium oxide (quick lime)

15. ……. is used in white washing walls.

Ans. Calcium hydroxide

III. Short Answer Questions

1. What is chemical change? Write an example.

Ans. Two or more substances react with each other to form new substance with different properties is called a chemical reaction or chemical change.

These are the following observations to determine that the chemical reaction has taken place.

i) Change in state
ii) Change in colour
iii) Evolution of gas and
iv) Change in temperature

Eg. Magnesium ribbon burnt in air

2. What is a chemical equation?

Ans. A chemical equation is the symbolic representation of a chemical reaction. In the form of symbols and formula it represents the reactants and products and their physical state symbolically.

Eg. Magnesium + Oxygen → Magnesium Oxide

$2Mg + O_2 \rightarrow 2MgO$

3. What is a Balanced Chemical equation?

Ans. An equation having an equal no. of atoms of each elements on both sides is called a balanced chemical equation.

Eg. $2Mg + O_2 \rightarrow 2MgO$

4. Why should the chemical equation be balanced?

Ans. According to the law of conservation of mass, mass can neither be created nor destroyed in a chemical reaction. That is the total mass of the elements present in the products of chemical reactions has to be equal to the total mass of the elements presents in the reactants. Hence we need to balance the chemical equation.

Eg. $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$

5. What is the balanced chemical equation for carbon monoxide and hydrogen to form Methanol?

Ans. Carbon monoxide gas combines with hydrogen gas to form methanol at 340 atm pressure.

$CO + 2H_2(g) \rightarrow CH_3OH(l)$

6. What are the different type of chemical reactions?

Ans. The different types of chemical reactions are

i) Combination reaction
ii) Decomposition reaction
iii) Displacement reaction
iv) Double displacement reaction
v) Oxidation and reduction [redox reaction]

7. What is a combination reaction? Write an example.

Ans. A reaction in which a single product is formed from two or more reactants is known as a combination reaction.

Examples:

$C(s) + O_2(g) \rightarrow CO_2(g)$

$2H_2 + O_2(g) \rightarrow 2H_2O(l)$

8. Why is calcium hydroxide used in white wash?

Ans. Calcium hydroxide is a solution of quick lime and water. It is used for white washing walls as it slowly reacts with CO_2 in air to form a thin layer of calcium carbonate which gives a shiny finish to the walls.

9. What is the chemical formula of Marble?

Ans. The calcium hydroxide react with carbon dioxide in the air to form calcium carbonate (marble).

$Ca(OH)_2(aq) + CO_2(g) \rightarrow CaCO_3(s) + H_2O$

$CaCO_3$ is calcium carbonate

10. What is an exothermic reaction? Write an example.

Ans. A reaction in which heat is released along with the formation of products is called an exothermic reaction.

$CaO_{(s)} + H_2O\ (i) \rightarrow Ca(OH)_2\ (aq) + Heat$

11. Respiration is an exothermic reaction. Why?

Ans. The rice, potatoes and bread we eat contain carbohydrate. During digestion these food is broken down to form glucose. This glucose combines with oxygen in the cells of our body and provides energy. Therefore it is an exothermic reaction.

12. Explain endothermic reaction. Write an example.

Ans. A reactions in which energy is absorbed in the form of heat from the surroundings is called an endothermic reaction.

Eg. a. Photosynthesis

b. $2AgCl \rightarrow 2Ag(s) + Cl_2$

13. What are decomposition reactions? Write an example.

Ans. Reactions in which a single reactant break down to give simpler products are called decomposition reactions

Eg. $2FeSO_4(s) \xrightarrow{\text{heat}} Fe_2O_3(s) + SO_2(g) + SO_3(g)$

14. Write an example of decomposition reaction.

Ans. On heating lead nitrate brown fumes are emitted. These fumes are of nitrogen dioxide, oxygen gas and lead

oxide are also formed.

$2Pb(NO3)2\ (s) \rightarrow 2PbO\ (s) + 4NO2 + O2\ \ (g)$

15. Which reaction is used in Black and White photography? Explain.

Ans. The decomposition of silver chloride and silver bromide salt is used in Black and White photography.

Silver chloride decomposes in the presence of sunlight into silver and chlorine

$$2Agcl_{(s)} \underline{\text{sunlight}}, 2Ag(s) + Cl_2(g)$$

Silver bromide decomposes in the presence of sunlight into silver and bromine by light

$$2AgBr_2 \underline{\text{sunlight}}, 2Ag(s) + Br_2(g)$$

16. Define displacement reaction. Write an example.

Ans. A Chemical reaction in which a more reactive element displaces a less reactive element from its compound is called displacement reaction.

Eg. Reaction of iron nail with copper sulphate solution

$Fe(s) + CuSO_4\ (aq) \rightarrow FeSO_4(aq) + Cu(s)$

(Iron) (copper sulphate) (iron sulphate) (copper)

17. Zinc and Lead displace copper from its compound. Why?

Ans. Zinc and Lead displaces copper from its compound because Zinc and Lead are more reactive elements than copper

$Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4\ (aq) + Cu(s)$

(Zinc) (Copper sulphate) (Zinc sulphate)

Zinc displaces the copper from copper sulphate solution

$Pb(s) + CuCl_2\ (aq) \rightarrow PbCl_2(aq) + Cu(s)$

(Lead) Copper chloride Lead chloride

Lead displaces the copper from copper chloride solution.

18. Explain double displacement reaction? Write an example?

Ans. A Chemical reaction in which there is an exchange of anions and cations between the reactants are called a double displacement reaction.

Example:

$NaSO_4(aq) + BaCl_2 \rightarrow BaSO_4 + 2NaCl(aq)$

(sodium sulphate) (Barium Chloride) (Barium sulphate) (Sodium Chloride)

19. What is a precipitation reaction? Write an example.

Ans. A chemical reaction in which one of the products is an insoluble substance called precipitate is called a precipitation reaction.

$NaNO_3 + NaCl \rightarrow AgCl + NaNO_3$

(Silver Nitrate) (Sodium Chloride) (Silver Chloride) (Sodium Nitrate)

In this reaction Silver Chloride (AgCl) is precipitate that is AgCl is insoluble in water.

20. If we mix the solution of lead (II) nitrate and potassium iodide

i. What was the colour of precipitate formed? Write the name.

ii) Write the balanced chemical equation.

iii) Is this is a double replacement reaction ?

Ans. i) When lead nitrate and potassium iodide solution are mixed together to form lead iodide and potassium nitrate is formed. Lead iodide is the precipitate which show yellow colour.

ii) Balanced chemical equation is

$Pb(NO_3)_2 + 2\ KI \rightarrow 2KNO_3 + PbI_2$

(lead Nitrate) (Potassium iodide) (Potassium Nitrate) (Lead iodide) yellow colour

iii) Yes, this is a double replacement reaction.

21. When the copper powder is heated, a black substance is formed. The hydrogen gas is passed over this heated material it turns brown. Why?

Ans. While heating copper powder, the oxygen is added to copper to form copper oxide which is black in colour. The oxidation reaction take place here.

$$2Cu + O_2 \underrightarrow{\text{Heat}} 2CuO$$

The hydrogen gas is passed over this heated material (CuO) the black coating on the surface turns brown and copper is obtained. Copper oxide is reduced to copper.

$$CuO + H_2 \underrightarrow{\text{Heat}} Cu + H_2O$$

22. What is oxidation reaction? Write an example.

Ans.The process in which a substances loses an electron (or gains oxygen) during a chemical reaction is called oxidation reaction.

Eg. $4Na(s) + O_2(g) \rightarrow 2Na_2O(s)$

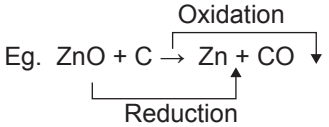
23. Define reduction reaction. Write an example.

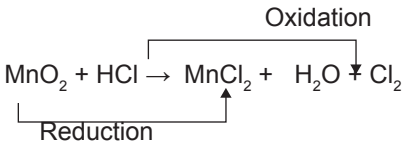
Ans. The process in which a substance gains an electron (or losses oxygen) during a chemical reaction is called a reduction reaction

Eg. $CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(l)$

24. Explain Redox reaction. Write two example.

Ans. A reaction in which one reactant undergoes oxidation whereas the other gets reduced during the course of reaction are termed as oxidation reduction reaction or redox Reaction.





25. Define corrosion. Write examples.

Ans. Corrosion is a process where the metal surfaces

are gradually eaten by the action of water, moisture or a chemical like acid.

Eg a. Rusting of iron
b. Black coating on silver
c. Green coating on copper

25. What is Rusting of Iron? What type of reaction take place in this reaction?

Ans. The iron metal is attacked by the substance around it such as moisture, acid etc. and get coated with a reddish brown powder on iron metal. This brown colour powder is known as ferrous oxide. It causes damage to the iron metal. It is an oxidation reaction.

$4Fe + 3O_2 + 2 \times H_2O \rightarrow 2Fe_2O_{3.X} H_2O$ (Rust)

27. What are the after effects of corrosion?

Ans. Corrosion causes damage to car bodies, bridge, iron railing, ship and all objects made of metal. Corrosion of iron is a serious problem.

28. How to prevent the corrosion?

Ans. The ways to prevent the corrosion are

a) Paint the metal: Paint the metal with any durable acrylic paint (do not use water soluble paint).
b) Keep away from moisture: Avoid contact with water or moisture. Make sure metals are dry.
c) Coat it with oil: Use of oil or grease reduces the chance of corrosion in metals.
d) Use stainless steel: Steel is an alloy of iron and zinc. Presence of zinc in iron decreases the oxidation.

29. Explain Rancidity.

Ans. Rancidity is the complete or incomplete oxidation or hydrolysis of fats and oils when exposed to air, light or moisture resulting in unpleasant taste and odour. It is an oxidation reaction.

Eg. When fried chips are kept outside for a long time it starts giving unpleasant smell.

30. What are the precautions to prevent rancidity?

Ans. The precautions are

i) Store the food in an air tight container, this keeps the food fresh for a long time.
ii) Store the food in refrigerator to keep it fresh for a long time.
iii) By adding antioxidants to foods containing fats and oils.
Eg. Vinegar added to pickles.
Vinegar is an antioxidants.
iv) By packing fat and oil containing food in nitrogen gas.
v) Storing food away from light.

31. Chips manufactures usually flush bags of chips with gas such as nitrogen. Why?

Ans. Chips manufactures usually flush bags of chips with nitrogen gas because this non-reactive gas prevent the food to come in direct contact with air.

32. What is an antioxidant?

Ans. Antioxidant is a substance which prevents oxidation, if added to food containing fats and oil. This substance is called antioxidant.

Eg. Vinegar added to pickle, Pizza, Ketchup.

NCERT SOLUTIONS

1. Why should a magnesium ribbon be cleaned before burning in air?

Ans. A magnesium ribbon be cleaned before burning in air because when magnesium is stored it react with oxygen or air to form magnesium oxide. This layer of magnesium oxide is quite stable and prevent further reaction of magnesium with oxygen

2. Write the balanced equation for the following chemical reactions.

i) Hydrogen + Chlorine → Hydrogen chloride
ii) Barium Chloride + Aluminium sulphate → Barium sulphate + Aluminium chloride
iii) Sodium+water → Sodium hydroxide + Hydrogen

Ans. i) Hydrogen + Chlorine → hydrogen chloride
$H_2 + Cl_2 \rightarrow 2HCl$
ii) Barium Chloride + Aluminum sulphate → Barium sulphate + Aluminum chloride
$3BaCl_2 + Al_2(SO_4)_3 \rightarrow 3BaSO_4 + 2AlCl_3$
iii) Sodium + Water → Sodium hydroxide + Hydrogen
$2Na + 2H_2O \rightarrow 2NaOH + H_2$

3. Write a balanced chemical equation with state symbols for the following reaction.

i) Solutions of Barium chloride and sodium sulphate in water react to give insoluble barium sulphate and the solution of sodium chloride.
ii) Sodium hydroxide solution (in water) react with hydrochloric acid solution in water to produce sodium chloride solution and water.

Ans. i) $BaCl_2(aq) + Na_2SO_4(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$
ii) $NaOH(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l)$

4. A solution of substance 'X' is used for whitewashing

i) Name the substance 'X' and write its formula.
ii) Write the reaction of the substance 'X' named in (i) above with water.

Ans: i) The substance 'X' is calcium oxide (lime).
Its chemical formula is CaO
ii) Calcium oxide react vigorously with water to form calcium hydroxide (slaked lime).

$CaO + H_2O \rightarrow Ca(OH)_2$
(Calcium oxide) (Water) (Calcium hydroxide)

5. Why is the amount of gas collected in one of the test tubes in activity 1.7 (electrolysis of water) double of the amount collect in the air? Name this gas?

Ans. Water (H_2O) contain two parts of hydrogen and one part of oxygen. So the amount of hydrogen and oxygen

produced during electrolysis of water is in 2:1 ratio. During electrolysis, since hydrogen goes to one test tube and oxygen goes to another hence the amount of gas collected in one of the test tube is double the amount collected in the other. The gas collected in double the amount is hydrogen and the other gas is oxygen.

6. Why does the colour of copper Sulphate solution change when an iron nail is dipped it?

Ans. When an iron nail is placed in a copper sulphate solution, iron displaces copper from the blue coloured copper sulphate solution forming light green coloured ferrous sulphate solution and copper metal.

$Fe(s) + CuSO_4(aq) \rightarrow FeSo_4(aq) + Cu(s)$

7 . Give an example of double displacement reaction other than the one given in Activity 1.10.

Ans. A double displacement reaction between the reactants lead nitrate and potassium iodide gives new substances - a yellow precipitate of lead iodide and potassium nitrate.

$Pb(NO_3)_2(aq) + 2KI(aq) \rightarrow PbI_2(s) + 2KNO_3(aq)$

8. Identify the substances that are oxidized and the substances that are reduced in the following reaction.

i) $4Na(s) + O_2(g) \rightarrow 2Na_2O(s)$

ii) $CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(i)$

Ans. i) Sodium (Na) is oxidized to sodium oxide as it gain oxygen and oxygen (O_2) gets reduced.

ii) Copper oxide (CuO) is reduced to copper (Cu) while hydrogen (H_2) get oxidized to water (H_2O).

9. What is a balanced chemical equations? Why should chemical equations should be balanced?

Ans. A chemical equation is balanced when the numbers of atoms of each type involved in a chemical reaction are same on both the reactant and product sides of the equation.

The chemical equations must always be balanced to satisfy the law of conservation of mass which states that 'Mass can neither be created nor destroyed in a chemical reaction'. This means that the total mass of the element presents in the products of a chemical reaction has to be equal to the total mass of the elements present in the reactant. Hence the number of atoms of each elements in the product must be equal to the number of atoms of these elements in the reactants.

10. Translate the following statement in to chemical equations and then balance them.

a. Hydrogen gas combines with nitrogen to form ammonia.

b. Hydrogen sulphide gas burns in air to give water and sulphur dioxide.

c. Barium chloride reacts with aluminum sulphate to give aluminum chloride and precipitate of barium sulphate.

d. Potassium metal react with water to give potassium hydroxide and hydrogen gas.

Ans. a) $3H_2 + N_2 \rightarrow 2NH_3$

b) $2H_2S + 3O_2 \rightarrow 2H_2O + 2SO_2$

c) $2BaCl_2 + Al_2(SO_4)_3 \rightarrow 2AlCl_3 + 3BaSO_4$

d) $2K + 2H_2O \rightarrow 2KOH + H_2$

11. Balance the following chemical equation

a) $HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + H_2O$

b) $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$

c) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$

d) $BaCl_2 + H_2So_4 \rightarrow BaSO_4 + HCl$

Ans a) $2HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + 2H_2O$

b) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

c) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$

d) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

12. Write the balanced chemical equations for following reactions.

a) Calcium Hydroxide + Carbon dioxide →Calcium Carbonate + water

b) Zinc + Silver nitrate → Zinc nitrate + Silver

c) Aluminum + copper chloride → Aluminum chloride + copper

d) Barium chloride + Potassium sulphate → Barium Sulphate + Potassium chloride

Ans a) $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

b) $Zn + 2AgNO_3 \rightarrow Zn(NO_3)_2 + 2Ag$

c) $2Al + 3CuCl_2 \rightarrow 2AlCl_3 + 3Cu$

d) $BaCl_2 + K_2SO_4 \rightarrow BaSO_4 + 2KCl$

13. Write the balanced chemical equations for the following and identify the type of reactions in each case.

a) Potassium bromide (aq) + Barium iodide (aq) → Potassium iodide (aq) + Barium bromide (s)

b) Zinc carbonate (s) → zinc oxide(s) + carbon dioxide (g)

c) Hydrogen (g) + Chlorine(g) → Hydrogen chloride(g)

d) Magnesium (s) + Hydrochloric acid (aq) →Magnesium chloride(aq) + Hydrogen(g)

Ans. a) $2KBr(aq) + BaI_2 \rightarrow 2KI(aq) + BaBr_2(s)$

Double displacement reaction and precipitation reaction.

b) $ZnCO_3(s) \rightarrow ZnO(s) + CO_2(g)$, Decomposition reaction.

c) $H_2 + Cl_2(g) \rightarrow 2HCl(aq)$, Combination reaction

d) $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(s) + H_2(g)$, Displacement reaction.

14. What does mean by exothermic and endothermic reactions? Give examples.

Ans. Reactions in which heat is released along with the formation of products are called exothermic reactions.

Eg. Burning of natural gas.

$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g) + Heat$

Reactions in which energy is absorbed are known as endothermic reactions.

Eg. $2AgBr(s)$ sunlight $2Ag(s) + Br_2(g)$

15. Why is respiration considered an exothermic reaction? Explain.

Ans. Food that we eat includes carbohydrates, proteins,

Vitamin etc. During digestion carbohydrates are broken down into simpler substance called glucose. Glucose combines with oxygen in the cells of our body to form carbon dioxide, and water along with energy. This reaction is called respiration. Since energy is released during this process, respiration is an exothermic reaction.

$C_6H_{12}O_6$ (aq) +$6O_2$(g) → $6CO_2$(aq) + $6H_2O$(l) + energy

16. Why are decomposition reactions called the opposite of combination reactions? Write equation of these reactions.

Ans. In the decomposition reaction, a single substance decomposes to give two or more substances. Whereas in a combination reaction two or more substance combine to form a new single substance and hence decomposition reactions are opposite of combination reactions.

Decomposition reaction

Eg. $CaCO_3(s) \xrightarrow{heat} CaO(s) + CO_2(g)$

Combination reaction

C(s) +O_2(g) → CO_2

17. Write one equation each for decomposition reactions where energy is supplied in the form of heat light or electricity.

[Previous question CBSE 2018]

Ans. Heat

$$Ca\ CO_3(s) \xrightarrow{heat} CaO(s) + CO_2(g)$$

Light

$$2AgBr(s) \xrightarrow{sunlight} 2Ag(s) + Br_2(g)$$

Electricity

$$2H_2O(I) \xrightarrow{electricity} 2H_2(g) + O_2(g)$$

18. What is the difference between displacement and double displacement reactions? Write equations of these reactions.

Ans. A displacement reaction is a chemical reaction in which a more reactive element displaces a less reactive element from its salt solution.

Eg. Fe + $CuSO_4$ → $FeSO_4$ +Cu

In this reaction, one displacement is taking place. Fe is displacing Cu.

Double displacement reaction is a chemical reactions in which there is an exchange of ions between the reactants to give new substance. There are two displacement taking place in a double displacement reaction.

Eg: $3BaCl_2$ + $Al_2(SO_4)_3$ → $2AlCl_3$ + $BaSO_4$

In this reaction two displacement are taking places Ba is displacing Al and Al is displacing Ba.

19. In the refining of silver the recovery of silver from silver nitrate solution involved displacement by copper metal. Write down the reaction involved.

Ans. $2AgNO_3(aq) + Cu(s) \rightarrow Cu(NO_3)_2 + 2Ag(s)$

20. What do you mean by a precipitation reaction? Explain by giving examples.

Ans . Any reaction that produces an insoluble solid (precipitate) can be called a precipitation reaction.

These insoluble salt separate out from the solution and settle down as precipitate.

Eg. When aqueous sodium sulphate solution and aqueous barium chloride are reacted aqueous solution of sodium chloride and white precipitate of Barium sulphate are formed

$NaSO_4(aq) + BaCl_2(aq) \rightarrow$

$2NaCl(aq) + BaSO_{4(white\ ppt)}$

21. Explain the following terms of gain or loss of oxygen with two examples each.

a. Oxidation

b. Reduction

a. Oxidation: It is the gain of oxygen by a substance in a reaction.

eg: When magnesium is burned in air magnesium oxide is formed

$2Mg + O_2 \rightarrow 2MgO$

Here magnesium is oxidized to magnesium oxide. It has gain oxygen.

Eg(2) When copper oxide is heated with hydrogen, copper metal and water are formed.

$CuO + H_2 \rightarrow Cu + H_2O$

Here, H_2 is getting oxidized to H_2O it has gained oxygen.

Reduction: It is the loss of oxygen by a substance in a reaction.

Eg. When zinc oxide is heated with carbon, zinc metal and carbon monoxide are formed.

$ZnO + C \rightarrow Zn + CO$

ZnO getting reduced to Zn. It has lost oxygen

Eg. When copper oxide is heated with hydrogen, copper metal and water are formed.

$CuO + H_2 \rightarrow Cu + H_2O$

Here CuO is getting reduced to Cu. It has lost oxygen .

22. A shiny brown coloured element 'X' on heating in air becomes black in colour. Name the element 'X' and the black coloured compound formed.

Ans. The shiny brown coloured element 'X' is copper and the black coloured compound is copper oxide (CuO) the chemical reaction is

$2Cu + O2 \xrightarrow{heat} 2CuO$

23. Why do we apply paint on iron articles?

Ans . We apply paint on iron articles to avoid their rusting. When a coat of paint is applied to the surface of an iron article, it stop the contact of air and moisture with the iron metal and hence no rusting take place.

24. Oil and fat containing food item are flushed with nitrogen. Why?

Ans. When food items containing fat and oil are kept for a long time, they get oxidized by aerial oxidation and become rancid and their smell and taste change. Food items containing oil and fat are flushed with nitrogen to prevent rancidity of oil and fats. Nitrogen is an inert gas and prevent the oxidation of oil and fats.

25. Explain the following terms with one example each.

a) Corrosion

b) Rancidity

a) Corrosion: Corrosion is a process where the water or moisture on the surface of the metal oxidizes with atmospheric oxygen .

eg. Rusting of iron

Black coating on silver

b) Rancidity: When food items containing fat and oil are kept for a long time, they get oxidized and their smell and taste change. This process is known as Rancidity.

Eg. When butter kept in open for long time tastes and smell bad because of rancidity.

EXTRA QUESTIONS AND ANSWERS

1. A student added a few pieces of aluminum metal to two test tubes A and B containing aqueous solution of iron sulphate and copper sulphate. In the second part of her experiment, she added iron metal to another test tubes C and D containing aqueous solutions of aluminum sulphate and copper sulphate.

In which test tube or test tubes will she observe colour change? On the basis of this experiment, state which one is the most reactive metal and why? [previous question CBSE syllabus 2018)

Ans: The reaction occurs when student added piece of aluminium metal to two test tube A and B

Test tube A: $2Al + 3FeSO_4 \rightarrow Al_2(SO_4)_3 + 3Fe$

Test tube B: $2Al + 3CuSO_4 \rightarrow Al_2(SO_4)_3 + 3Cu$

The reaction occurs when student added piece of iron metal in test tube C and D

Test tube C: $2Fe + Al_2(SO_4)_3 \rightarrow$ No Reaction

Test tube D: $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

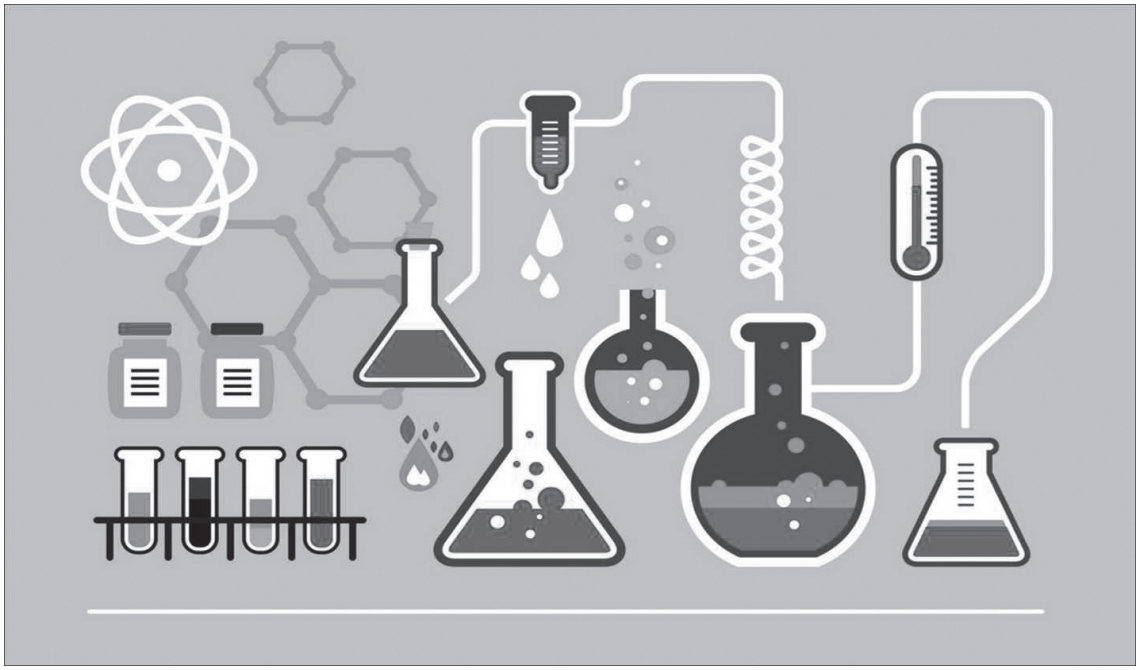
The colour change can be observed in Test Tube A, B, D, no reaction will be observed in test tube C because Al is more reactive than iron.

2. What is observed when a solution of sodium sulphate is added to a solution of barium chloride taken in a test tube? Write equation for the chemical reaction involved and name the type of reaction in this case. [Previous questions CBSE syllabus 2018]

Ans: When sodium sulphate is added to barium chloride, it gives white precipitate of barium sulphate which is insoluble in water. The reaction also creates sodium chloride which remains dissolved in water and so cannot be seen.

It is double displacement reaction.

$Na_2SO_4 + BaCl_2 \rightarrow 2NaCl + BaSO_4$



SCIENCE
BIOLOGY

CHAPTER 6

LIFE PROCESSES

TOPICS

- **What are life processes**
- **Modes of Nutrition**
- **Autotrophic Nutrition**
  - → Raw materials for photosynthesis
  - → Site of Photosynthesis
  - → Main Events of Photosynthesis
- **Stomata**
  - → Functions of stomata
- **Heterotrophic Nutrition**
  - → How organisms obtain their food
- **Nutrition in Amoeba**
- **Nutrition in Human Beings**
  - → Human Digestive System

INTRODUCTION

We already have known about living and non living things. All living things perform certain life processes like growth, excretion, respiration, circulation etc. Animals, birds and human beings are living beings. These fall asleep in the night or day. We see them breathing so we know that they are alive. Some animals can breathe without visible movement. So using visible movement as the defining characteristics of life is not enough.

The plants, they grow over time we tend to think of some sort of movement either growth related or not. But a plant that is not visibly growing is still alive. The invisible molecular movement is necessary for life because all the structures are made up of molecules they must move molecules around all the time.

Therefore, let's define what life process here is, "all the processes like respiration, digestion, which together keep the living organisms live and perform the job of body maintenance are called life processes.

MODES OF NUTRITION

- **Nutrition in Plants**
  - (i) Plants are autotrophs.
  - (ii) Make their own food.
- **Nutrition in Animals**
  - (i) Animals are heterotrophs.
  - (ii) Depends on plants or others for food.

AUTOTROPHIC NUTRITION

It is a kind of nutrition in which inorganic materials like CO_2, water etc. are utilized to prepare organic food by the process of photosynthesis.
E.g: Green plants.

- Autotrophs use simple inorganic material and convert it into complex high energy molecule (Carbohydrates)
- What is photosynthesis?
- Autotrophic nutrition is fulfilled by the process by which autotrophs take in CO_2 and H_2O and convert these into carbohydrates in the presence of chlorophyll, sunlight is called Photosynthesis
- Raw materials for photosynthesis are Sunlight, Chlorophyll, CO_2 and Water
- Main Events of Photosynthesis:

a) Absorption of light energy by chlorophyll.

b) Conversion of light energy into chemical energy.

c) Reduction of CO_2 to carbohydrates.

STOMATA

Stomata are the tiny pores present on the surface of the leaves for exchange of gases O_2/CO_2.

FUNCTIONS OF STOMATA

The two main functions of stomata are to allow for the uptake of carbon dioxide and to limit the loss water due to transpiration.

HETEROTROPHIC NUTRITION

Kind of nutrition in which organisms does not possess the ability to synthesize their own food. It depends on autotrophs for their food supply directly or indirectly.
Example: Animals, fungi.

HOLOZOIC NUTRITION: AMOEBA, ANIMALS

Saprophytic Nutrition: Fungi.

Parasitic Nutrition: Cuscuta (plant parasite), Ticks etc.

- **How organisms obtain their food**

Unicellular/Single celled organisms: Food is taken up through body surface.
Example: Amoeba, Paramecium.

NUTRITION IN HUMAN BEINGS

The alimentary canal is basically a long tube extending from the mouth to the anus. Various
regions are specialised to perform different functions.

(i) Mouth.
(ii) Bursal Cavity
(iii) Pharynx
(iv) Oesophagus
(v) Stomach
(vi) Small Intestine
(vii) Large Intestine

(a) Walls of small intestine secrete intestinal enzyme which convert Carbohydrates into glucose fats into fatty acid + glycerol and Proteins into amino acids.
(b) It has Villi (finger like projection) which help in the absorption of food into blood.
(c) It receives the secretions of the liver and pancreas. The food is acidic which is made alkaline for the pancreatic enzymes to act. The pancreas secretes

pancreatic juice which contains enzymes like trypsin for digesting proteins and lipase breaking down emulsified fats.

Fats are present in the intestine in the form of large globules which makes it difficult for enzyme to act on them. Bile salts break them down into smaller globules which increases the efficiency enzyme action.

(viii) Large Intestine:

(a) Absorb excess of water.
(b) The rest of the material is removed from the body via the anus.

• Respiration in Human Beings

It is the process of gas exchange between the air and an organism's cells. Breakdown of Glucose by Various Pathways

Types of Respiration

There are three types of respiration

1. Internal: respiration involves gas exchange between the blood and body cells.
2. External: is the breathing process, which involves inhalation and exhalation of gases.
3. Cellular: involves the conversion of food to energy.

Respiration in Human Beings

Respiration involves:

(i) Gaseous exchange (Breathing) : Intake of oxygen from the atmosphere and release of CO_2.
(ii) Cellular respiration: Breakdown of simple food in order to release energy inside the cell.

• Breakdown of Glucose by Various Pathways

The first step is the break-down of glucose (a six-carbon molecule) into a three-carbon molecule called pyruvate which takes place in the cytoplasm.

The pyruvate may be converted into ethanol and carbon dioxide which takes place in yeast during fermentation. Since this process takes place in the absence of air (oxygen), it is called anaerobic respiration.

The pyruvate is broken down into three-carbon pyruvate molecule in the presence of oxygen to give three molecules of carbon dioxide and water. This process takes place in mitochondria. Since this process takes place in the presence of air (oxygen), it is called aerobic respiration.

The pyruvate is converted into lactic acid when there is a lack of oxygen in our muscle cells is also a three-carbon molecule. This build-up of lactic acid in our muscles during sudden activity causes cramps in museles.

The energy released during cellular respiration is immediately used to synthesise a molecule called ATP which is used to fuel all other activities in the cell. In these processes, ATP is broken down giving rise to a fixed amount of energy which can drive the endothermic reactions taking place in the cell.

The rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms because the amount of dissolved oxygen is fairly low compared to the amount of oxygen in the air.

• Human Respiratory System

Different parts of respiratory system are:

Nostril: Air is taken into the body.

Nasal Passage: It is a channel for airflow through the nose.

Nasal Cavity: It is lined with hairs and mucus membrane. It warms, moisturize, and filter air before it reaches the lungs.

Pharynx: It contains rings of cartilage which ensure that the air-passage does not collapse.

Larynx: It houses the vocal cords and manipulates pitch and volume, which is essential for phonation. It is also known as voice box.

Trachea: Pharynx splits into trachea and esophagus. It connects the larynx (or voice box) to the bronchi of the lungs. It provides air flow to and from the lungs for respiration.

Bronchi: They are the main passage way into the lungs. They are the extensions of the windpipe that shuttle air to and from the lungs. The oxygen goes to the lungs and carbon dioxide leave the lungs through them.

Bronchioles: Bronchi get smaller when they reaches closer to lungs tissues and are called Bronchioles. They are the passageways by which air passes through the nose or mouth to the alveoli of the lungs.

Alveoli: They are smaller tubes which finally terminate in balloon – like structure which are called alveoli. They allow oxygen and carbon dioxide to move between the lungs and bloodstream.

Blood capillaries: They are the sites of the transfer of oxygen and other nutrients from the bloodstream to other tissues in the body. They also collect carbon dioxide and waste material and return it to the veins.

Respiration in plants

Respiration in plants is simpler than the respiration in animals. Gaseous exchange occur through.

(a) Stomata in leaves
(b) Lenticels in stems
(c) General surface of the root

Transportation in Human Beings

Human beings like other multicellular organism need regular supply of food, oxygen etc. This function is performed by circulatory system.

The circulatory system in human beings consists of:

(i) Heart (pumping organ)
(ii) Arteries, Veins, Blood Capillaries and Blood vessels
(iii) Blood and lymph (Circulatory medium)

Blood circulation in human body

Double circulation: Blood travels twice through the heart in one complete cycle of the body

Direction of blood flow through human heart

Pulmonary Circulation: Blood moves from the heart to the lungs and back to the heart.

Systemic Circulation: Blood moves from the heart to rest of the body and back to the heart.

• Blood

Blood is connective tissue which is fluid in nature.

Solid components of blood (Blood corpuscles):

(i) RBC (Red blood cells): It carries O_2 and CO_2 and also contain Haemoglobin which impart red colour to the blood.
(ii) WBC (White blood cells): It provides body defence by engulfing the germs and produces antibodies.
(iii) Blood Platelets: It helps in blood clotting during injury.

• Lymph

It is a yellowish fluid which escapes from the blood capillaries into the intercellular spaces. It contains less proteins than blood. It flows from the tissues to the heart which helps in transportation and destroying germs. It carries digested and absorbed fat from intestine and drains excess fluid from extra cellular space back into the blood.

• Types of Blood Vessels

There are two types of blood vessels
(i) Arteries
(ii) Veins
(iii) Capillaries

Transportation in Plants

There are two main conducting pathways in a plant.
(i) Xylem
(ii) Phloem

Transpiration and its Functions

It is the process of loss of water as vapour from aerial parts of the plant.

Function :

(a) Absorption and upward movement of water and minerals by creating PULL.
(b) Helps in temperature regulation in plant.
Transport of food from leaves (food factory) to different part of the plant is called Translocation

Excretory System in Human Beings

Excretory/urinary system consists of :

(1) **The kidneys :** The excretory organ
(2) **The ureters :** The ducts which drain out urine from the kidneys
(3) **The urinary bladder :** The urinary reservoir
(4) **The urethra :** The channel to the exterior

Formation of urine in Humans.

(i) **Glomerular filtration:** Nitrogenous wastes, glucose water, amino acid filter from the blood into Bowman Capsule of the nephron.

(ii) **Tubular reabsorption:** Now, useful substances from the filtrate are reabsorbed back by capillaries surrounding the nephron.

(iii) **Secretion:** Urea, extra water and salts are secreted into the tubule which open up into the collecting duct & then into the ureter.

Excretion in Plants

Plants use different strategies for excretion of different products :

1) Oxygen and carbon dioxide is diffused through stomata.
2) Excess water is removed by transpiration.
3) Plants can even loose some of their old parts like old leaves and bark of tree.
4) Other waste products like raisins and gums especially in old xylem cells which can also be lost by plants.
5) Plants also secrete some waste substances into the soil around them.

MULTIPLE CHOICE QUESTIONS (MCQ)

1. It is used in the process of breakdown of food sources for cellular needs
a. Nitrogen b. Oxygen
c. Carbon dioxide c. None of these
Answer : b. Oxygen

2. Which life process converts chemical energy into heat energy?
a. Nutrition b. Respiration
c. Excretion d. Transpiration
Answer : b. Respiration

3. Which of the following are energy giving foods?
a. Carbohydrates and fat
b. Proteins and mineral salts
c. Vitamin and minerals
d. Water and roughage
Answer : a. Carbohydrates and fats.

4. In which mode of nutrition an organism derives its food from the body of another living organism?
a. Saprotrophic nutrition
b. Parasitic nutrition
c. Holozoic nutrition
d. Autotrophic nutrition
Answer : b. Parasitic nutrition

5. The mode of nutrition found in fungi is
a. Parasitic nutrition
b. Holozoic nutrition
c. Autotrophic nutrition
d. Saprotrophic nutrition
Answer : d. Saprotrophic nutrition

6. The energy derived from the food we eat is stored in our body in the form of
a. Glucose b. Glycogen
c. Sucrose d. None of these
Answer : b. Glycogen

7. In leaf absorption of light energy by
a. Chlorophyll b. Mitochondria
c. Phloem d. Xylem
Answer : a. Chlorophyll

8. The site of photosynthesis in the cells of a leaf is
a. Cytoplasm b. Protoplasm
c. Mitochondria d. Chloroplast
Answer : d. Chloroplast

9. Gaseous exchange takes places in the leaves through
a. Xylem b. Stomata
c. Cytoplasm d. Mitochondria
Answer : b. Stomata

10. Roots of the plant absorb water from the soil through the process of
a. Diffusion b. transpiration
c. Osmosis d. None of these
Answer : c. Osmosis

11. The elements used in the synthesis of proteins and other compounds
a. Nitrogen b. Phosphorus
c. Iron d. Magnesium
Answer : a. Nitrogen

12. The organism which break down the food material outside the body and then absorb it
a. Fungi b. Yeast
c. Mushroom d. All of these
Answer : d. All of these

13. Which of the following is parasitic nutritive animal?
a. Deer b. Leeches
c. Yeast d. Fungi
Answer : b. Leeches

14. In Amoeba food is digested in the
a. Food vacuole b. Mitochondria
c. Pseudopodia d. Chloroplast
Answer : a. Food Vacuole

15. In which animal, food is moved to the specific spot by the movement of Cilia
a. Amoeba b. Paramecium
c. Hydra d. None of these
Answer : b. Paramecium

16. Which of the following events in the mouth cavity will be affected if Salivary Amylase is lacking in the Saliva.
a. Starch breaking down into sugar
b. Protein breaking down into Amino acid
c. Absorption of Vitamins
d. Fats breaking down into fully acids and glycerol.
Answer : a. Starch breaking down into sugar

17. The enzyme which digest the protein.
a. Salivary Amylase b. Hydrochloric acid c . Pepsin d. Insulin
Answer : c. Pepsin

18. It protects the inner lining of the stomach from the action of the acid under normal condition
a. Pepsin b. Hydrochloric acid
c. Mucus d. Trypsin
Answer : c. Mucus

19. Which region of alimentary canal absorbs the digested food?
a. Stomach b. Small intestine
c. Large Intestine d. Liver
Answer : b. Small Intestine

20. The contraction and expansion movement of the wall of food pipe is called
a. Translocation b. Transpiration c . Peristaltic Movement d. Digestion
Answer : c. Peristaltic Movement

21. When a few drops of iodine solution are added to rice water, the solution turns blue – black in colour. This indicates that rice water contains.
a. Fats b. Complex Proteins
c. Starch d. Simple Proteins
Answer : c. Starch

22. The exit of unabsorbed food material is regulated by
a. Liver b. Anus
c. Small intestine d. Anal Sphincter
Answer : d. Anal Sphincter

23. What are the products obtained by anaerobic respiration in microorganisms?
a. Lactic acid and Energy
b. Carbon dioxide, water and energy
c. Ethanol, Carbon dioxide and energy
d. Pyruvate
Answer : c. Ethanol, Carbon dioxide and energy

24. The breakdown of pyruvate to give carbon dioxide water and energy take place in
a. Cytoplasm b. Mitochondria
c. Chloroplast d. Nucleus
Answer : b. Mitochondria

25. What are the products obtained by anaerobic respiration in our muscles?
a. Lactic acid and energy
b. Carbon dioxide , water and energy
c. Ethanol, Carbon dioxide and energy
d. Pyruvate
Answer : a. Lactic acid and energy

26. Glycolysis process occurs in which part of the cell.
a. Cytoplasm b. nucleus
c. Mitochondria d. Chloroplast
Answer : a. Cytoplasm

27. The respiratory pigment in human beings is
a. Carotene b. Chlorophyll
c. Haemoglobin d. Mitochondria
Answer : c. Haemoglobin

28. It ensures that the air passage does not collapse when the air passes through throat and in to the lungs.
a. Oesophagus b. Nostrils
c. Cartilage d. None of these
Answer : c. Cartilage

29. The haemoglobin present in
a. red blood corpuscles b. white blood corpuscles
c. Platelets d. Plasma
Answer : a. red blood corpuscles

30. A blood vessel which pumps the blood from the heart to the entire body.
a. Artery b. Capillary
c. Vein d. Haemoglobin
Answer : a. Artery

31. Name the circulatory fluid in the human body other than blood.
a. Platelets b. RBC
c. Lymph d. Plasma
Answer : c. Lymph

32. Oxygen is carried by
a. RBC b. WBC
c. Platelets d. Lymph
Answer : a. RBCs

33. Single circulation i.e., blood flows through the heart only once during one cycle of passage through the body is exhibited by which of the following.
a. hyla, rana, draco
b. Whale, dolphin, turtle
c. labeo, chameleon, salamander
d. hippocampus, exocoetus, anabas
Answer : d. Hippocampus, exocoetus and Anabas

34. The cell which help to clot the blood at the point of injury.

a. RBC b. WBC
c. Platelets d. Lymph
Answer : c. Platelets

35. It carries digested and absorbed fat from intestine and drains excess fluid from extra cellular space back into the blood.
a. RBC b. WBC
c. Plasma d. Lymph
Answer : a. Lymph

36. Which plant tissue transports water and minerals from the roots to the leaf?
a. Xylem b. Phloem
c. Parenchyma d. Collenchyma
Answer : a. Xylem

37. The movement of food in phloem is called
a. transpiration b. translocation
c. respiration d. evaporation
Answer : b. translocation

38. Name the tube which connect the kidney to the urinary bladder
a. Urethra b. Nephron
c. Tubule d. Ureters
Answer : d. Ureters

39. It helps in the absorption and upward movement of water and minerals dissolved in it from roots to leaves.
a. transpiration b. translocation
c. respiration d. evaporation
Answer : a. transpiration

40. Which part of Nephron allows the selective reabsorption of useful substance like glucose amino acids, salts and water into the blood capillaries?
a. Tubule b. Glomerulus
c. Bowman's capsule d. Ureter
Answer : a. Tubule

41. Where is the dirty blood in our body filtered?
a. Heart b. Lungs
c. Ureter d. Kidneys
Answer : d. kidneys

42. The procedure used for cleaning the blood of a person by separating urea from it is called.
a. Osmosis b. filtration
c. dialysis d. double circulate
Answer : c. dialysis

43. A gland not associated with the alimentary canal is
a. liver b. salivary glands c . pancreas d. adrenal
Answer : d. adrenal

44. Which of the following are chiefly digested in the stomach?
a. carbohydrates b. proteins
c. lipids d. fats
Answer : b. Proteins

45. One cell thick vessels are called
a. Arteries b. veins
c. Capillaries d. Pulmonary artery
Answer : c. Capillaries

FILL IN THE BLANKS

1. ……. are utilised for providing energy to the organisms.
Answer : Carbohydrates

2. The ……. are essentials for photosynthesis.
Answer : Chlorophyll, Sunlight,CO_2 , H_2O

3. ……that breaks down starch which is a complex molecule to give simple sugar.
Answer : Salivary Amylase

4. The gastric glands release ……..
Answer : Hydrochloric acid, Gastric Juice

5. The inner lining of the small intestine has numerous finger like projections called ……
Answer : Villi

6. The glucose break down to pyruvate in ……
Answer : Cytoplasm

7. The lactic acid in our muscles during sudden activity causes ……..
Answer : Cramps

8. …….. is used to fuel all other activities in the cell
Answer : ATP

9. …….. is the energy currency for most cellular processes.
Answer : ATP

10. Carbon dioxide and oxygen are exchanged by ……
Answer : Diffusion

11. ……... transports food, carbon dioxide and nitrogenous wastes in dissolved form.
Answer : Plasma

12. …….. ensure that blood does not flow backward when the atria or ventricles contract.
Answer : Valves

13. …….. have three chambered hearts.
Answer : Amphibians

14. ……. is the force that blood exert against the wall of vessel.
Answer : Pressure

15. The pressure of blood inside the artery during ventricular contraction is ……..
Answer : Systolic Pressure

16. …… is the pressure in artery during ventricular relaxation
Answer : Diastolic pressure

17. The normal blood pressure of a human is ……..
Answer : 120/80 mm/Hg.

18. Blood pressure is measured with ……..
Answer : Sphygmomanometer

19. The smallest vessels have walls which are one cell thick are called ……..
Answer : Capillaries

20. The loss of water in the form of vapour from the aerial parts of plants is ……..

Answer : Transpiration

21. Urea or Uric acid are removed from blood in the ……

Answer : Kidneys

22. …….. is the filtration units in kidneys.

Answer : Nephrons

23. ……and …….. are the waste products of plants

Answer : resins and gums

QUESTIONS AND ANSWERS

1. What are nutrients?

Answer : Nutrients are various organic and inorganic substance required by the organism to carry out their function.

2. What is heterotrophic nutrition?

Answer : The process of nutrition where the organisms obtain their food from other organism.

Example : Most of the bacteria fungi and all animals.

3. What is photosynthesis?

Answer: Photosynthesis is a process which utilizes carbon dioxide and water in the presence of sunlight and chlorophyll to synthesize carbohydrates like glucose.

4. Name the different types of heterotrophic nutrition?

Answer : Heterotrophic nutrition is classified as holozoic, saprotrophic and symbiotic parasitic.

5. What are enzymes? Name any one enzyme of our digestive system and write functions.

Answer : Enzymes are biological catalysts. Catalysts are proteins that increase the rate of chemical reactions without being used up.

Example : Amylase catalyses the breakdown of starch into sugars in the mouth and small intestine.

6. Write the balanced chemical equation for the process of photosynthesis.

Answer : Photosynthesis can be represented using a chemical equation. The overall balanced equation is

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6H_2O + 6O_2$$

7. When do the deserts plants take up carbon dioxide and perform photosynthesis?

Answer : Desert plants open up their stomata during night and take in CO_2. Stomata remain close during the day time to prevent the loss of water by transpiration. They store the CO_2 in their cells until the sun rises out and they can carry on with photosynthesis during the day time.

8. What is the process take place during photosynthesis?

Answer : The following events occur during this process.

i. Absorption of light energy by chlorophyll.
ii. Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.
iii. Reduction of carbon dioxide to carbohydrates.

9. Explain. How does the exchange of gases occur in plants across the surface of stem roots and leaves?

Answer : In plants there are tiny pores called stomata. On leaves and lenticels in stem which facilitate the exchange of gases. Carbon dioxide is taken in and oxygen give out (photo synthesis) and vice versa (respiration).

10. In single celled organisms diffusion is sufficient to meet all their requirements, food exchange of gaseous or removal of wastes but it is not in case of multicellular organisms. Explain the reason for this difference.

Answer : Unicellular organisms can absorb sufficient oxygen because of its complete contact with the atmosphere but in multicellular organisms the rate of absorption and diffusion becomes very less because all cells are not in direct contact with the atmosphere. Multicellular organisms require greater amount of oxygen to sustain life processes which cannot be full filled by the process of diffusion.

11. Explain the nutrition in Amoeba.

Answer : Amoeba intakes food using temporary finger like extensions of the cell surface which fuse over the food particle forming a food vacuole. Inside the food vacuole complex substance are broken down into simpler ones which then diffuse in cytoplasm. The remaining undigested material is moved to the surface of the cell and thrown out.

12. Write the nutrition in paramecium.

Answer : Paramecium is also a unicellular organism, the cell has a definite shape and food is taken in at a specific spot called gullet. Food is moved to this spot by the movement of cilia which cover the entire surface of the cell.

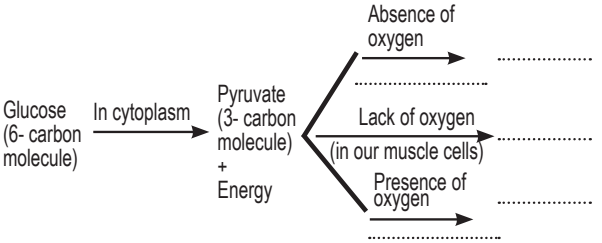
13. The length of the small intestine differs in herbivores and carnivores. Why?

Answer : The length of the small intestine differ in herbivores and carnivores because the herbivores eat grass, need a longer small intestine to allow the cellulose to be digested. Meat is easier to digest hence carnivores have a shorter small intestine.

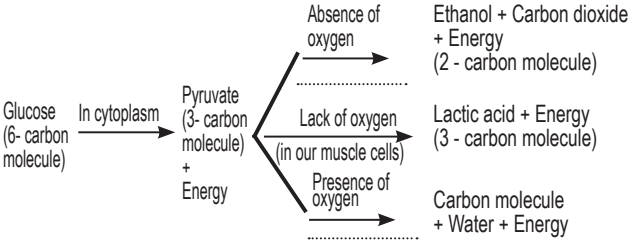
14. What is Villi and write the uses?

Answer : The inner lining of the small intestine has numerous finger like projections called Villi. The Villi which increase the surface area for absorption. The villi are richly supplied with blood vessels which take the absorbed food to each and every cell of the body.

15. Complete the diagram.



Answer :



16. What is ATP?

Answer : ATP is the energy currency for most cellular processes. The energy released during the process of respiration is used to make an ATP molecule from ADP and inorganic phosphate.

ADP + P ⟶ ATP

17. Name the process by which autotrophs prepare their own food.

Answer : By the process of photosynthesis autotrophs prepare their own foods.

18. In human alimentary canal, Name the site of complete digestion of various components of food?

Answer : Complete digestion of various components of food take place in small intestine.

19. What is the primary requirement for pancreatic enzymes to act?

Answer : Pancreatic enzymes trypsin and lipase act only in alkaline medium.

20. What do you mean by emulsification of fat?

Answer : Large fat globules are broken down into small fat globules by the action of bile juice this is called emulsification of fat.

21. Which is the food constituent that bile help to digest and absorb?

Answer : Fats are the food constituent which are digested and absorbed by with the help of bile.

22. What are the final products after digestion of carbohydrates and proteins?

Answer : Glucose and amino acids are the final products after digestion of carbohydrates and proteins respectively.

23. State the role of the following in human respiratory system.

a. Nasal Hairs

b. Diaphragm c. Alveoli

Answer :

a. Nasal Hairs : These are fine hairs present in the lining of the nasal passage. Hair help in filtering the air passing through it so that germ free air could reach the lungs.

b. Diaphragm: It is a muscular partition between the thoracic and abdominal region in our body. Movement of diaphragm helps in the breathing process.

c. Alveoli : These are balloon like structures, which increase the surface area for the gaseous exchange to take place in the lungs.

24. State reason for the following trachea does not collapse when it has insufficient air.

Answer : The wall of trachea are lined by cartilaginous rings that help in maintaining the rigidity of the trachea. Hence the trachea do not collapse during insufficient air.

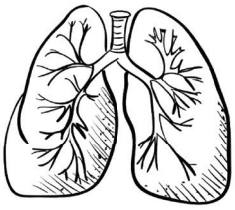
25. Aquatic animals breaths rapidly. Why?

Answer : Aquatic animals utilise the oxygen dissolved in water for respiration. Since the amount of dissolved oxygen is fairly low compared to the amount of oxygen in air the rate of breathing is faster in aquatic organism.

26. Haemoglobin is present in RBC in humans. Why?

Answer : Haemoglobin is present in RBC in human beings. It is a respiratory pigment that helps in easy and faster transport of oxygen all through the body.

27. Draw a diagram of human respiratory system and label on it.



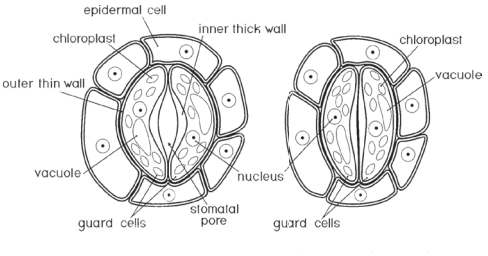
28. a. Draw the diagram to show open stomatal pore and label on it

i. guard cells ii. Chloroplast

b. State two functions of stomata

c. How do guard cells regulate the opening and closing of stomatal pore.

Answer : a.



b. Two functions of stomata are

i. Exchange of gases between the plants and the atmosphere take place through stomata.

ii. Transpiration in plants take places through stomata.

c. Opening and closing of stomatal pore : The opening and closing of the pore is a function of the guard cells. The guard cell swell when water flows into them causing the stomatal pore to open.

The pores closes if the guard cells shrink. A large amount of water is lost through these stomata, the plant closes these pores when it is does not require carbon dioxide for photo synthesis.

29. State the function of the following components of transport system: Blood

Answer : Blood

a. Oxygen is transported by the blood to the tissue of the body for the breakdown of digested food.

b. Carbon dioxide is transported to the lungs by the blood plasma

c. The digested and absorbed nutrients are transported by blood to the tissues Nitrogenous waste are transported to the kidneys.

d. It regulates the body temperature and maintain pH of the body tissues

e. It transports various hormones from one region to another and bring about the coordination.

f. It maintains water balance to constant levels.

g. The lymphocytes produces antibodies against the invading antigens and protect from diseases.

h. It help in rapid healing antigens and protect from diseases.

30. Write the function of lymph

Answer:

a. It cleans the cellular environment.

b. It returns protein and tissues fluids to the blood (drainage)
c. It provides a pathway for the absorption of fats and fat soluble vitamins into the blood stream.
d. It defends the body against disease.

31. List three difference in Arteries and veins in tabular form.

Arteries

1. Arteries carries oxygenated blood, away from the heart except pulmonary artery.
2. These are mostly situated deep in the body.
3. These are thick – walled highly muscular except arteries of cranium and vertebral column.

Veins

1. It carry deoxygenated blood towards the heart except pulmonary veins.
2. These are superficial and deep in location
3. These are thin walled.

32. In mammals and birds why is it necessary to separate oxygenated and deoxygenated blood. (NCERT page 110 Question no. 2)

Answer : Mammals and birds are warm blooded animals. This means they can control their body temperature and do not have to depend on environment for their body temperature regulations. Because of this birds and mammals require optimum oxidisation of glucose which would be possible with good supply of oxygen. So it is required to have separate oxygenated and deoxygenated blood is supply the require amount of oxygen.

33. What will happen to a plant if its xylem removed?

Answer : Xylem in plants transports water and dissolved mineral nutrients from the roots to all parts of the vascular plants. So if xylem is removed from the plants, the water and mineral supply to the plant will stop and therefore, the plant will die.

34. How are water and minerals transported in plants?

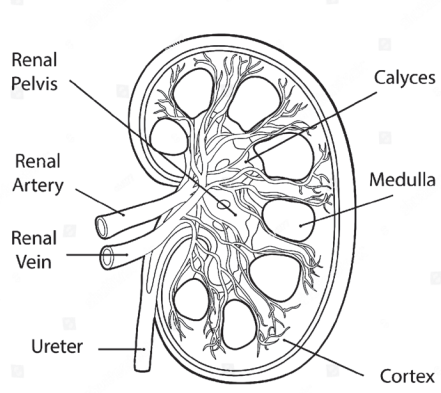
Answer : Water and minerals are transported with in the plant by the Xylem. Vessels mainly help in upward direction and these are part of the vascular system which also includes phloem vessels.

Phloem transports the products of photosynthesis with in the plant, to all parts like the stem, roots, fruits etc. in all direction.

35. What do you mean translocation?

Answer : The transport of soluble products of photosynthesis is called translocation and it occurs in the part of the vascular tissue known as phloem.

36. Draw a diagram of human excretory system and label renal artery and Urethra.



37. What is the function of renal artery?

Answer : The renal artery carries blood to the kidneys from the abdominal aorta. This blood comes directly from the heart and is sent to the kidneys to be filtered before it passes through the rest of the body. Up to one third of the total cardiac out put per heart beats is sent to the renal arteries to be filtered by the kidneys. Each kidney has one renal artery that supplies it with blood. The filtered blood then can exit the renal veins.

38. Write the function of kidneys?

Answer : The kidneys perform the essential function of removing waste products from the blood and regulating the water fluid levels. The kidney regulate the body's fluid volume, mineral composition and acidity by excreting and reabsorbing water and organic electrolyte.

39. Write the function of ureter and urinary bladder?

Answer : Ureter :- It is a tube that carries urine from the kidney to the urinary bladder. There are two ureters that attached to each kidney.

Urinary bladder :- The urinary bladder is an expandable muscular sac that stores urine before it is excreted out of the body through the urethra.

40. What happens to glucose that enters the nephron along with filtrate?

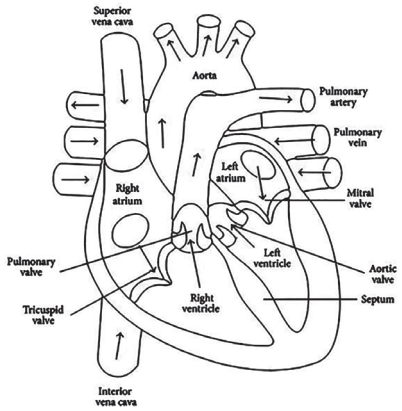
Answer : During excretion in human beings glucose which enters the Nephron along with filtrate gets reabsorbed by blood capillaries surrounding the Nephron.

41. Write the note about excretion in plants.

Answer : Oxygen itself can be thought of as a waste products generated during photosynthesis. They can get rid of excess water by transpiration through stomata. Some of the wastes stored in the leaves are removed by the detachment of the leaves itself from the tree. Waste are also stored in the cellular vacuoles which do not affect the functionary of cytoplasm. Other waste products are stored in resins and gums.

42. Draw the diagram of hearts and labelled it

Draw the figure



NCERT SOLUTION

1. Why is diffusion sufficient to meet the oxygen requirements of multicellular organisms like humans?

Answer : In multicellular organisms like humans, all the

body cells are not in direct contact with the surroundings environment. Therefore diffusion is insufficient to meet the oxygen requirements of multicellular organisms.

2. What criteria do we use to decide whether something is alive?

Answer : The main criteria used to decide whether something is alive are breathing and respiration. However living being also show growth and movement.

3. What are outside raw material used by an organism?

Answer : Any organism uses organic molecules as raw material. Heterotrophs use food and autotrophs use carbodioxide minerals, water and all organisms use oxygen as raw materials.

4. What process would you consider essential for maintaining life?

Answer : Processes essential for maintaining life are :-

1. Nutrition ii. Respiration
iii. Transportation iv. Excretion

PAGE NO 101

1. What are the difference between autotrophic nutrition and heterotrophic nutrition?

Answer :

Autotrophic Nutrition

a. Food is synthesised from simple inorganic raw material such as CO_2 and water.
b. Chlorophyll is required
c. Food is generally prepared during day time.
d. All green plants and some bacteria have this type of nutrition.

Heterotrophic Nutrition

a. Food is obtained by directly or indirectly from autotrophs. This food is broken down with the help of enzymes.
b. Chlorophyll is not required
c. Food can be obtained at all time
d. All animals and fungi have this type of nutrition.

2. Where do plants get each of the raw materials required for photosynthesis?

Answer : The following raw materials are required for photosynthesis.

a. Carbon dioxide: - plants get CO_2 from atmosphere through stomata.
b. Water : Plants absorb water from soil through roots and transport to leaves.
c. Sunlight : Sunlight which is absorbed by the chlorophyll and other green parts of plants.

3. What is the role of the acid in our stomach?

Answer : Roles of the acid in our stomach are

The hydrochloric acid present in our stomach dissolves bits of food and creates an acidic medium enzyme pepsinogen is converted to pepsin which is a protein – digesting enzyme. It also kills many bacteria and other microorganisms that enter along with the food.

4. What is the function of digestive enzyme?

Answer : Digestive enzyme such as amylase, lipase, pepsin, trypsin etc. help in the breaking down of complex food particles in to simple ones. These simple particles can be easily absorbed by the blood and thus transported to all the cells of the body.

5. How is the small intestine designed to absorb digested food?

Answer : The small intestine has millions of tiny finger like projections called villi. These villi increase the surface area for more efficient food absorption within these villi many blood vessels are present that absorb the digested food and carry it to the blood stream, the absorbed food is delivered to each and every cell of the body.

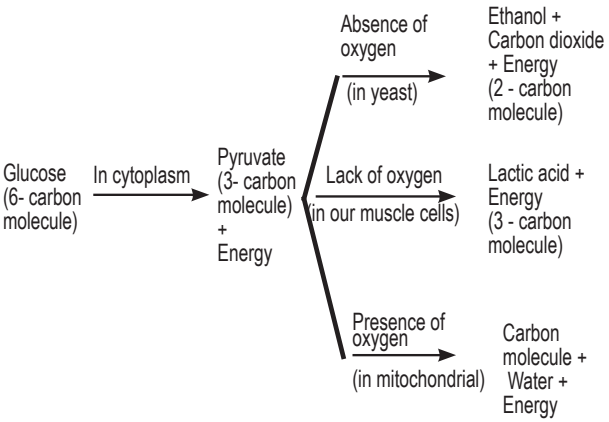
PAGE 105

1. What advantage over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen?

Answer : Terrestrial organism take up oxygen from the atmosphere where as aquatic animals obtain oxygen from the water. Air contains more O_2 as compared to water. Since the content of O_2 in air is high, the terrestrial animals do not have to breathe faster to get more oxygen. Therefore, in like aquatic animals, terrestrial animals do not need adaptations for gaseous exchange.

2. What are the different ways in which glucose is oxidised to provide energy in various organisms?

Answer : At first glucose (6-carbon molecule) is broken in the cytoplasm of cells of all organisms. This process yield a 3-Carbon molecule compound called Pyruvate. Further break down of pyruvate take place in different manner is different organism.



Anaerobic respiration

This process takes place in absence of oxygen.

Example : Yeast during fermentations

In this case pyruvate is converted into ethanol and CO_2

Aerobic Respiration

In aerobic respiration the breakdown of pyruvate take place in presence of O_2 to give rise to 3 molecules of CO_2 and water. The release of energy in aerobic respiration is much more than anaerobic respiration.

Lack of Oxygen

Some times when there is lack of oxygen, especially during vigorous activity in our muscles Pyruvate is converted in to lactic acid formation of lactic acid in muscles causes cramps.

3. How is oxygen and carbon dioxide transported in human beings?

Answer : Transport of oxygen : The respiratory pigments

(haemoglobin) present in RBC take up the oxygen from the air to the lungs. They carry the O_2 to tissues which are deficient in O_2

Transport of CO_2

CO_2 is more soluble in water. Hence it is mostly transported from body tissues in the dissolved form in our blood plasma to lungs where it diffuses from blood to our in the lungs and then expelled out through nostrils.

4. How are the lungs designed in human beings maximising the area for exchange of gases?

Answer : Lungs contain millions of alveoli which provide a surface for the exchange of gases. An extensive network of blood vessels is present in the wall of alveoli. By lifting our ribs and flatten the diaphragm, the chest cavity becomes spacious. Air is sucked in to the lungs and alveoli. The O_2 from the breath diffuses into the blood and CO_2 from the blood brought from the body, diffuses out in to the air.

PAGE NO 110

1. What are the components of the transport system in human beings? What are the functions of these components?

Answer : The main components of the transported system in human beings are the heart, blood and blood vessels. It pumps oxygenated blood throughout the body. It receives de oxygenated blood from the various body parts and send this impure blood to the lungs for oxygenation blood. It helps in the transport of O_2 , nutrients, CO_2 and nitrogenous wastes.

The Blood Vessels (arteries, veins and capillaries) carry blood either away from the heart to various organs or from various organs back to the heart.

3. What are the components of the transport system in highly organised plants?

Answer : In highly organised plants, there are two different types of conducting tissues – Xylem and phloem :

Xylem conducts water and minerals obtained from the soil to the rest of the plant.

Phloem transport food materials from the leaves to different parts of the plant.

4. How are water and minerals transported in plants?

Answer : Water and minerals are transported through Xylem cells from soil to the leaves. The xylem cells of roots stem and leaves are interconnected to form a conducting channel that reaches all parts of a plant. The root cells takes ion from the soil. This creates a difference between the concentration of ions of roots and soil. Therefore there is a steady movement of water into Xylem. An osmotic pressure is formed and water and minerals are transported from one cell to the other cell due to osmosis. The continuous loss of water takes place due to transportation. Because of transpiration, a suction pressure is created as result of which water is forced in to the Xylem cells of roots. The effect of root pressure for transportation in plants is more important in night while during day time transpiration pull becomes the major driving force.

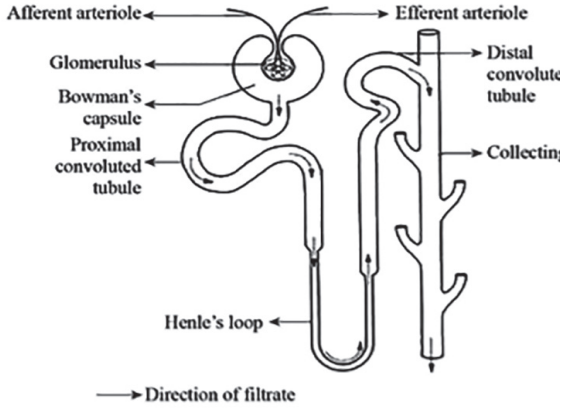
5. How is food transported in plants?

Answer : Phloem transports food materials from the leaves to different parts of the plants. The transportable of food in phloem is achieved by utilizing energy from ATP which helps in creating osmotic pressure that transport food from the area of high concentration to law concentration.

PAGE NO 112

1. Describe the structure and functioning of Nephrons.

Answer : Nephrons are the basic filtering units of kidneys. Each kidney possesses large number of Nephrons. The main components of Nephrons are glomerulus, Bowman's capsule and long renal cube.



Functions of Nephron

a. The blood enters the kidney through the renal artery, which branches into many capillaries associated with glomerulus.

b. The water and solute are transferred to the nephron at Bowman's capsule.

c. In the proximal tubule some substance such as amino acids glucose and salts are selectively reabsorbed and unwanted molecules are added in the urine.

d. In the filtrate then moves down in to the loop of Henle, where more water is absorbed.

e. From here, the filtrate move upwards into the distal tubule and finally to the collecting duct. It collects urine from many nephrons.

f. The urine formed in each kidney enters along tube called ureter. From ureter, it gets transported to ire urinary bladder and then into the urethra.

2. What are the methods used by plants to get rid of excretory products?

Answer : Plants can get rid of excess of water by transpiration. Waste materials may be stored in the cell vacuoles or as gum and resin, especially in old Xylem.

3. How is the amount of urine produced regulated?

Answer : The amount of urine produced depends on the amount of excess water and dissolved wastes present in the body. Some other factor such as anti diuretic hormones (ADH) also regulates the current of urine produced.

PAGE NO. 113

1. The Kidneys in human beings are a part of the system for

a. nutrition b. respiration
c. excretion d. transportation

Answer : c. excretion

2. The xylem in plants is responsible for

a. transport of water b. transport of food
c. transport of amino acids
d. transport of oxygen

Answer : a. transport of water

3. The autotrophic mode of nutrition requires

a. CO_2 and water
b. chlorophyll
c. sunlight
d. all of the above

Answer : d. all of the above

4. The breakdown of pyruvate to give CO_2, water and energy take place in

a. Cytoplasm b. Mitochondria
c. Chloroplast d. Nucleus

Answer : b. Mitochondria

5. How are fats emulsified in our bodies? Where does this process take place?

Answer : Fats are present in the form of large globules in the small intestine. The small intestine receives the secretions from the liver and the pancreas. The bile salts break down the large fat globules in to smaller globules. So that the pancreatic enzyme lipase can easily act on them. This is referred to as emulsification of fats. This process takes places in the small intestine.

6. What is the role of saliva in the digestion of food?

Answer : The role of saliva in the digestion of food are,

i. It moistens the food for easy swallowing.
ii. It containing digestive enzyme called salivary amylase, which breaks down starch into sugar.

7. What are the necessary conditions for autotrophic nutrition and what are its by-products?

Answer : Autotrophic nutrition takes place through the process photosynthesis CO_2, water and chlorophyll and sunlight are the necessary conditions required for autotrophic nutrition. Carbohydrates and O_2 are the by products of photosynthesis.

8. What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic mode of respiration.

Answer :

Aerobic respiration

1. It occur in presence of O_2
2. It involves the exchange of gases between the organism and the outside environment.
3. It occurs in mitochondria.
4. It always releases CO_2 and water.

Anaerobic respiration

1. It occurs in the absence of O_2
2. Exchange of gases absent
3. It occurs only in cytoplasm
4. End products vary

9. How are the alveoli designed to maximum the exchange of gases?

Answer : Alveoli provide a surface for the exchange of gases. An extensive network of blood vessels is present in the wall of the alveoli. By lifting our ribs and flatten the diaphragm, the chest cavity becomes spacious. Air is sucked in to the lungs and alveoli. The O_2 from the breathe diffuses in to the blood and CO_2 from the blood brought from the body diffuses out in to the air.

10. What would be the consequences of a deficiency of haemoglobin in our bodies?

Answer : Haemoglobin is the respiratory pigment that transports oxygen to the body cells for cellular respiration. Therefore deficiency of haemoglobin in blood can affects the oxygen supplying capacity of blood. This can lead to deficiency of oxygen in the body cells. It can also leads to a disease called anaemia.

11. Describe double circulation in human being. Why is it necessary?

Answer : During single cycle blood goes twice in the heart which is known as double circulation. It is necessary in human being to separate oxygenated and de oxygenated blood because this makes their circulatory system is more efficient and helps in maintaining constant body temperature.

12. What are the difference between the transport of materials in Xylem and phloem?

Answer :

Xylem

1. It helps in the transport of water and minerals.
2. Water is transported upward from the roots to all other plant parts.
3. Transport in Xylem occurs with the help of simple physical forces such as transpiration.

Phloem

1. It helps in transpiration of food.
2. Food is transported in both upward and downward directions.
3. Transport of food in phloem requires energy in the form of ATP.

13. Compare the function of Alveoli in the lungs and Nephrons in the kidney with respect to their structure and function.

Answer: **Alveoli**

1. These are tiny balloon like structure present inside the lungs.
2. The walls of alveoli are one cell thick and it contains an extensive network of blood capillaries.

Function

1. The exchange of O_2 and CO_2 takes place between the blood of the capillaries that surround the alveoli and the gases present in the alveoli.
2. Alveoli are the site of gaseous exchange.

Nephron

1. They are tubular structures present inside the kidney.
2. Nephrons are made of glomerulus, Bowman's capsule and long renal tubes.

Function

1. The blood enters the kidneys through the renal artery. The blood is entered here and the nitrogenous waste in the form of urine is collected by collecting duct.
2. Nephrons are the basic filtration units.

CHAPTER 12

ELECTRICITY

INTRODUCTION

Charge is a fundamental particles in an atom. It may be positive or negative. Like charges repel each other and unlike charges attract each other.

Q = ne

Where, Q = Charge (total)

n = No. of electrons

e = Charge on 1 electron

Current

• **Current (I):** The rate of flow of charge is called current.

Current = Charge/Time $\Rightarrow$ I = Q/t

S. I. unit of current = Ampere (A)

1 A = 1 Cs^{-1}

1 mA = 10^{-3} A

1 μA = 10^{-6} A

Current is measured by Ammeter. Ammeter has low resistance and always connected in series. Direction of current is taken opposite to flow of electrons as electrons were not known at the time when the phenomenon of electricity was discovered first and current was considered to be flow of positive charge.

Potential Difference

- **Potential Difference (V):** Work done to move a unit charge from one point to another.

  V = W/Q
- **1 Volt:** When 1 joule work is done in carrying one Coulomb charge then potential difference is 1 volt.

  S. I. unit of Potential difference = Volt (V)

  1 V = 1 JC^{-1}
- **1 Volt:** When 1 joule work is done in carrying one Coulomb charge from one point to another then potential difference between them then potential difference is 1 volt.

  V = W/Q
- **Voltmeter:** It is an instrument to measure the potential difference. It has high resistance and always connected in parallel. Cell is the simplest device to maintain potential difference. Current always flow from higher potential to lower potential.

Ohm's Law

Potential difference across the two points of a metallic conductor is directly proportional to current passing through the circuit provided that temperature remains constant.

• Mathematical expression for Ohm's law

$V \alpha I$

V = IR

R is a constant called resistance for a given metal.

Resistance (R): It is the property of a conductor to resist the flow of charges through it.

ohm (Ω) : S.I. Unit of resistance

1 ohm = 1 volt / 1 ampere

When potential difference is 1 V and current through the circuit is 1 A, then resistance is 1 ohm

• **Rheostat:** This variable resistance is a component used to regulate current without changing the source of voltage.

Factors on which the Resistance of a Conductor depends

• Resistance of a uniform metallic conductor is:

(i) directly proportional to the length of conductor,

(ii) inversely proportional to the area of cross-section,

(iii) directly proportional to the temperature and

(iv) depend on nature of material.

• **Resistivity (ρ):** It is defined as the resistance offered by a cube of a material of side 1m when current flows perpendicular to its opposite faces.

• Its S.I. unit is ohm-metre (Ωm).

Resistivity does not change with change in length or area of cross-section but it changes with change in temperature. Range of resistivity of insulators is 10^{12} to 10^{17} Ωm. Resistivity of alloy is generally higher than that of its constituent metals. Alloys do not oxidize (burn) readily at high temperature, so they are commonly used in electrical heating devices. Copper and aluminium are used for electrical transmission lines as they have low resistivity.

Resistors in Series

When two or more resistors are connected end to end, the arrangement is called series combination.

Total/resultant/overall/effective resistance in series

$R_s = R_1 + R_2 + R_3 + ...$

Resistors in Parallel

Voltage across each resistor is same and equal to the applied voltage. Total current is equal to sum of currents through the individual resistances. Reciprocal of equivalent resistance is equal to sum of reciprocals of individual resistances. Equivalent resistance is less than the value of the smallest individual resistance in the combination.

$1/R_p = 1/R_1 + 1/R_2 + 1/R_3 + ...$

Advantages of Parallel Combination over Series Combination

(i) In series circuit, when one component fails, the circuit is broken and none of the component works.

(ii) Different appliances have different requirement of

current. This cannot be satisfied in series as current remains same.

(iii) The total resistance in a parallel circuit is decreased.

Heating effect of electric current

If an electric circuit is purely resistive, the source of energy continually get dissipated entirely in form of heat. This is known as heating effect of electric current.

Joule's Law of Heating

It states that the heat produced in a resistor is (i) directly proportional to square of current, $H \alpha I^2$. It is directly proportional to resistance for a given current, $H \alpha R$. It is directly proportional to time for which current flows through the conductor, $H \alpha t$. So, $H = I^2 Rt$. Heating effect is desirable in devices like electric heater, electric iron, electric bulb etc. Heating effect is undesirable in devices like computers, computer monitors (CRT), TV, refrigerators, etc. In electric bulb, most of the power consumed by the filament appears a heat and a small part of it is radiated in form of light.

• Filament of electric bulb is made up of tungsten because:

(i) it does not oxidise readily at high temperature.

(ii) it has high melting point (3380° C).

The bulbs are filled with chemically inactive gases like nitrogen and argon to prolong the life of filament.

• **Electric Fuse:** It is a safety device that protects our electrical appliances in case of short circuit or overloading. Fuse is made up of pure tin or alloy of copper and tin. Fuse is always connected in series with live wire. Fuse has low melting point. Current capacity of fuse is slightly higher than that of the appliance.

• **Electric Power:** The rate at which electric energy is consumed or dissipated in an electric circuit.

Important Formulae

$$I = \frac{Q}{t}, \quad V = IR, \quad I = \frac{V}{R}$$

$$V = \frac{W}{Q} \quad H = I^2 Rt, \; H = VIt, \; P = VI$$

$$E = Pt$$

$$H = E = W = VQ$$

$$R = \frac{\rho \ell}{A} \quad P = VI$$

$$\text{No. of electrons} = \frac{\text{Amount charges (Q)}}{\text{Charge of one electron}}$$

$$R_S = R_1 + R_2 + R_3 + \ldots$$

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots$$

$$\text{No. of resistors (n)} = \frac{R}{R_P}$$

$$n = \frac{\text{Resistance of one resistor}}{\text{Total resistance is parallel}}$$

SI units of

(Charge) Q ⟶ coulomb (C)

Current (I) ⟶ ampere (A)

Potential Difference = Voltage ⟶ Volt (V)

Resistance ⟶ ohm (Ω)

Energy =Work done ⟶ joule (J)

Resistivity ⟶ ohm metre (Ω m)

Power (P) ⟶ watt (W)

Multiple choice question

1. The SI unit of electric charge
a) ohm (Ω) b) Coulomb (C)
c) Volt (V) d) Charge (Q)
Answer : b) coulomb (c)

2. A ……..measures electric current in a circuit
a) Voltmeter b) Rheostat
c) Ammeter d) Key
Answer : c) Ammeter

3. A current of 0.5 A is drawn by a filament of an electric bulb for 5 minutes. What is Q?
a) 300C b) 1500C
c) 150C d) 3000C
Answer : c) 150C

4. Keeping the potential difference constant, the resistance of the circuit is halved. The current will become
a) one fourth b) four times
c) half d) double
Answer : d) double

5. The potential difference measured by
a) Ammeter b) Voltmeter
c) Rheostat d) None of these
Answer : b) Voltmeter

6. When electric current I flows through a resistance R for time 't' the electrical energy spent is given by
a) IRt b) I^2Rt
c) IR^2t d) I^2R/t
Answer : b) I^2Rt

7. Electric current originate from which part of an atom
a) Nucleus b) Entire atom acting as unit c) Positively charged proton
d) Negatively charged electrons
Answer: d) Negatively charged electrons

8. The resistance of the wire varies inversely as
a) Area of cross section b) Resistively
c) Length d) Temperature
Answer : a) Area of cross section

9. The ratio of voltage and electrical current in a closed circuit.
a) Decreases b) Increases
c) Remains Constant d) Varies
Answer : c) Remains Constant

10. The curve representing ohm's law is
a) Linear b) Cosine function
c) Parabola d) Hyperbola
Answer : a) Linear

11. Ohm's law states which relationship between electrical quantities.
a) Volts = I/A b) Volts = IxR
c) Volts = C/Q d) V= R/Q
Answer : b) Volts = IxR

12. The SI unit of power is
a) Joule b) Ampere
c) walt d) ohm
Answer: c) walt

13. The relation between potential difference (V) and Current (I) was discovered by
a) Volt b) ohm
c) Newton d) Ampere
Answer : b) ohm

14. What is the most commonly used conductor in electronics
a) Copper b) Aluminum
c) Gold d) Silver
Answer: a) Copper

15. If resistance decreases, then current will.
a) Increases b) Double
c) Decreases d) Constant
Answer: a) Increases

16. In series combination resistance increases due to increase in
a) Area of cross section b) Voltage
c) Length d) Current
Answer : c) Length

17. When 4Ω resistor is connected across the terminal of 2V battery, the number of Coulombs passing through the resistor per second is
a) 0.5 b) 1 c) 2 d) 4
Answer: a) 0.5

18. Two appliances of rating 200 watt - 250 volts and 100 watt- 250 volts are joined in series to a 250 volts supply. Total power consumed in the circuit is
a) 46 watt b) 67 watt
c) 10 watt d) 30 watt
Answer : b) 67 watt

19. Which of the following laboratory apparatus is not used during the verification of ohm's law
a) Voltmeter b) Ammeter
c) Galvanometer d) Rheostat
Answer: c) Galvanometer

20. Electric pressure is also called
a) Resistance b) Power
c) Voltage d) Energy
Answer : c) Voltage

21. The resistance of a copper wire 200m long is 21Ω. If its thickness (diameter) is 0.44 mm, its specific resistance is around.
a) 1.2×10^{8} Ωm. b) 1.4×10^{8} Ωm.
c) 1.9×10^{8} Ωm. d) 1.6×10^{-8} Ωm.
Answer: d) 1.6×10^{-8} Ωm.

22. A current of 16 A divided between two branches in parallel of resistance 8 ohms and 12 ohms respectively. The current in each branch is
a) 6.4 A, 6.9 A b) 6.4 A, 9.6 A
c) 4.6 A, 6.9 A d) 4.6 A, 9.6 A
Answer : b) 6.4 A, 9.6 A

23. Which of the following material has a negative temperature coefficient of resistance.
a) Copper b) Aluminum
c) Carbon d) Brass
Answer : c) Carbon

24. The filament of an electric bulb is made up of
a) Carbon b) Aluminum
c) Tungston d) Nickel
Answer : c) Tungston

25. A closed switch has a resistance of
a) About 50 ohms b) About 500 ohms
c) Infinity d) Zero
Answer : d) Zero

26. An electric filament bulb can be worked from
a) DC supply only b) AC supply only
c) Battery supply only d) All above
Answer: d) All above

27. Two bulbs of 500 W and 200 W rated at 250 V will have resistance ratio as.
a) 2:5 b) 4:25
c) 25:4 d) 5:2
Answer : a) 2:5

28. Voltage dependent resistors are usually made from
a) Charcol b) Sillion Carbide
c) Nichrome d) Graphite
Answer : c) Nichrome

29. electric current passing through the circuit produces
a) Magnetic b) Luminous \
c) Thermal effect d) Chemical
Answer : c) Thermal effect

30. The four bulbs of 40 W each are connected in series with a battery across them, which of the following statement is true?
a) The current through each bulb in same
b) The voltage across each bulb is same
c) The power dissipation in each bulb is not same
d) None of the above

Answer : a) The current through each bulb in same.

FILL IN THE BLANKS

1. **Bulbs in street lightings are all connected in ……**
   Answer : Parallel
2. **Ohm's law is not applicable to ……..**
   Answer : Semiconductors
3. **…….. materials has the least resistivity**
   Answer : good coducting
4. **The SI unit of power is ……**
   Answer : Watt
5. **Conductance is the reciprocal of ……**
   Answer : Resistance
6. **An open resistor, when checked with an ohm meter reads ……..**
   Answer : Infinite
7. **All good conductors have high ……**
   Answer : Conductance
8. **Nichrome wire is an alloy of ……..**
   Answer : Nickel and Chromium
9. **One newton meter is same as ……..**
   Answer : One Joule
10. **The relation between potential difference (V) current (I) is ……**
    Answer : V α I
11. **The rate of flow of an electric charge is known as** …….
    Answer : electric current
12. **The unit of emf is ……**
    Answer : Volt
13. **The resistance of a conductor is directly proportion** to …….
    Answer : Length
14. **If resistance decreases then current will ……..**
    Answer : Increase
15. **Electric potential is a ……..**
    Answer : Scalar quantity

NUMERICALS FOR PRACTICE

1. **A particle with charge of 1.5C is taken from a point at potential of 50V to another point at a potential of 120V. Calculate the work done.**

Answer : 105J

2. **How many electrons are required to get 1C of negative charge?**

Answer : 6.25×10^{18}

3. **How much current will flow through a resistor of resistance 12ohm if a battery of 18V is connected across it?**

Answer ; 1.5A

4. **Calculate the resistance of a copper wire of length 2m and area of cross –section 2sqmm.**

Answer : $5.1 \times 10^{-3}\Omega$

5. **When a potential difference of 20V is applied across a resistor, it draws a current of 3A. If 30V is applied across the same resistor, what will be the current.**

Answer : 4.5 A

6. **How will the resistance of a wire change if its diameter is doubled, if its length remaining the same?**

Answer : New resistance will became ¼ of initial resistance

7. **Three resistors of resistance 4Ω, 6Ω, 10Ω are connected in series with 5V cell. Calculate the potential difference across each resistor.**

Answer : $V_1 = 1V$, $V_2 = 1.5\ V$, $V_3 = 2.5\ V$

8. **A uniform wire of resistance R is cut into three equal pieces. These are jointed in parallel. What is the resistance of the combination?**

Answer : $R_p = R/9$

9. **Three resistors of 10Ω, 20Ω, 30Ω are connected in parallel with a 6V cell. Find a) the current through each resistor b) the current supplied by the cell c) the equivalent resistance of the circuit.**

Answer : $I_1 = 0.6\ A$ $I_2 = 0.3A$ $I_3 = 0.2\ A$

10. **How will you join three resistors of resistance 4Ω,6Ω, 12Ω to get an equivalent resistance of 8Ω? What would be the highest and lowest equivalent resistance possible by joining these resistors?**

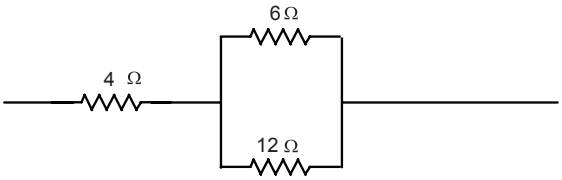
Highest resistance is obtained when they are in series. Rs = 6 + 4 + 12 = 22Ω.

Lowest, when they are in parallel.

$$\frac{1}{R_p} = \frac{1}{6} + \frac{1}{4} + \frac{1}{12} = \frac{2+3+1}{12} = \frac{6}{12} = \frac{1}{2}$$

$R_p = 2\Omega$

To get 8Ω, 6 Ω and 12 Ω are connected in parallel and with this combination 4Ω is connected in series.



$R_1 = 4\Omega$, $R_2 = 6\Omega$, $R_3 = 12\Omega$

$$\frac{1}{R_p} = \frac{1}{6} + \frac{1}{12} = \frac{2+1}{12} = \frac{3}{12} = \frac{1}{4}$$

$R_p = 4\Omega$, total resistance = 4 Ω + 4Ω = 8Ω

11. **How many bulbs of resistance 6 ohm should be joined in parallel to draw a current of 2A from a battery of 3V?**

Answer : n = 4

12. **A bulb is rated 40W, 220V. Find the current drawn by it is connected to a 220V supply.**

Answer : 0.18 A

13. A bulb is rated 60W, 240V, calculate its resistance when it is on. If the voltage drops to 192V, what will be the power consumed and the current drawn?

Answer : 38.4 W

14. An electric kettle is rated 500W, 220V. It is used to heat water for 30s. Assuming the voltage to be 220V, calculate the heat produced.

Answer : 15 kJ

15. The rate of electricity in a town is Rs.3 per unit. Calculate the cost of using a geyser of 1500W and a motor of 750W for 2 hour for 1 week.

Answer : Rs. 94.5

16. A3V battery is connected to a bulb. The battery sends a current of 2.5A through it. Calculate a) the power delivered to the bulb and b) the energy transferred to the bulb in 5 minutes.

Answer : P=7.5W, E=0.625Wh

17. A 12V battery is connected to a bulb. The battery sends a current of 2.5A through it. Calculate a) the power delivered to the bulb and b) the energy transferred to the bulb 5 minutes.

Answer : P= 30W, E = 2.5Wh

19. Calculate the work done in taking a charge of 0.02C from A to B if the potential at A is 20V, and that at B is 30V.

Answer :0.2J

20. How much charge flows through a wire in 10 minutes if the current through it is 2.5A?

Answer : 1500C

21. A 2V cell is connected to a 1ohm resistor. How many electrons will come out the negative terminal of the cell in 2 minutes?

Answer : 240 C

22. A 6V battery is connected across a 5ohm resistor. Calculate the current passing through the resistor.

Answer : 1.2 A

23. How will you join the resistors of 3ohm, 6 ohm and 8ohm to get an equivalent resistance of 10ohm?

Answer : Connect 3 Ω and 6 Ω in parallel and to this combination 8 Ω should be connected in series.

24. A 12V battery is connected to a bulb drives a current of 2A through it. Find the energy supplied by the battery in 20 minutes.

Answer : 28.8 kJ

26. A current of 1.5A flows through a wire of 8ohm. Find the amount of heat produced in 10s.

Answer : 180J

27. Two resistors 10 ohm and 20 ohm are joined in series. A potential difference of 12V is applied across the combination. Find the power consumed by the resistor.

Answer : 4.8 W

28. Calculate the energy consumed in kilowatt hours by a 60W fan in 2 hours.

Answer : 0.12kWh

29. An electric iron has a rating of 750W, 220V.C calculate a) current passing through it and b) its resistance when in use

Answer : I = 3.4 A, R = 64.5 Ω

30. An electric lamp is marked 100 W, 220V. It is used for 5 hours a daily calculate it's a) resistance while glowing and b) energy consumed in kWh per day?

Answer = R=484 Ω, E= 0.5 kWh

32. How many electrons are there in 10C of charge?

Answer : 6.25×10^{19}

33. An electric bulb draws a current of 0.2A when the voltage is 220V. Calculate the amount of electric charge following through it in one hour.

Answer : 720 C

34. Your are given a 8 ohm resistor. What will be resistance that you put in parallel to make a resistance of 2 ohm?

Answer : 2.66 Ω or $\frac{8}{3}$ Ω

35. Two bulb or whose resistances are in the ratio 1:2, are connected in parallel to a source of constant voltage. What will be the ratio of power dissipation of these?

Answer : $P_1 : P_2 = 2 : 1$

36. If a wire of resistivity (ρ) is stretched to thrice its initial length, what will be its new resistivity?

Answer :The resistivity will remain the same because resistivity does not depend on length, it depends only on temperature.

37. Which has greater resistance 1kw electric heater or a 100 W filament bulb both marked for 220V?

Answer: Filament has more resistance

38. Nichrome and copper wires of same length and same radius are connected in series current I is passed through them. Why does Nichrome wire heated up first?

Answer: Nichrome wire gets heated up first because it is an alloy that has higher resistivity produces more heat while copper has low resistivity and allows current to easily pass through it.

39. A wire of uniform area of cross section is stretched to four times its original length by what factor does id resistivity charge?

Answer: Its resistivity remains the same because it does not depend on length or area of cross section. It depends only on temperature. It increases when temperature increases.

40. Which has higher resistance: a 50W lamp bulb or a 245W lamp bulb? If potential difference provided to both is the same.

Answer = 50 W lamp bulb has more resistance.

41. In a household 5 tube light of 40W each are used for 5 hours and an electric press of 500W for 4 hours everyday. Calculate he total electrical energy consumed by both the gadgets in a month of 30 days.

Answer : 90kWh

42. Two identical resistors 2 ohm each are connected

in 1) series and 2) parallel to battery of 12V. Find the ratio of power consumed in two cases.

Answer : 1:2

43. Relate kWh with joule.

1kWh = 1000W × 3600s

= 3.6 × 10^6Ws

1kWh = 3.6 × 10^6J

44. What is the usual capacity of the fuse wire in line to feed a) light and fans b) appliances of 2k W or more power?

a. 5A b. 15A

QUESTIONS AND ANSWERS

1. Define electricity or electric current?

Answer: The rate of flow of electric charges is called electric current.

2. What does and electric circuit mean?

Answer: A closed and continuous path of electric current is called electric circuit.

3. What is a switch?

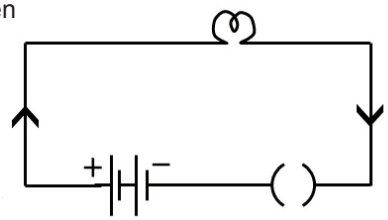
Answer: A switch acts as a conducting link between the source of electricity and the device (bulb).

4. Differentiate between open and closed circuit with figure.

Answer: **Open circuit**

Current does not flow

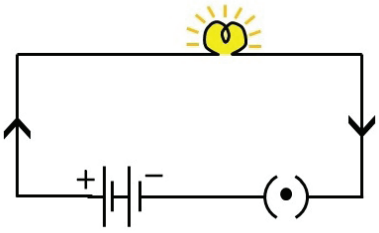
Switch is open



Closed circuit

Current flows

Switch is closed



5. Differentiate between conventional current and electron flow.

Answer: Conventional current

- Positive charges flow through circuit.
- Charges flow from the positive terminal to negative terminal

Answer: Electron flow

- Negative charges flow through circuit
- Charges flow from negative terminal to positive terminal

6. Give the relation between electric current, charges and time.

Answer: Electric current is the rate of flow of charges.

$$\text{Electric current (I)} = \frac{\text{Amount of Charges (Q)}}{\text{Time (t)}}$$

7. A current of 0.2A is drawn by an electric bulb for 5 mins. Find the amount of charge that flows through the circuit.

Answer:

I = 0.2A, t = 5 mins = 300 s $\quad 0.2A = \frac{Q}{300s}$

$I = \frac{Q}{t}$ $\quad Q = 0.2 \times 300 = 60C$

8. 200 C of charge is flowing in a circuit for 2 mins. Find the amount of current flowing through it.

Answer:

Q = 200 C, t = 2 mins = 120s $I = \frac{200}{120} = \frac{5}{3}$

$I = \frac{Q}{t}$ = 1.666A

9. What is the charge of electron? Calculate the number of electron constituting one coulomb of charge.

Answer:

The charge of an electron = 1.6 × 10^{19}C.

No of electrons = $\frac{1\not{C}}{1.6 \times 10^{19}\not{C}}$

$$n = \frac{1 \times 10^{19}}{1.6} = \frac{10}{16} \times 10^{19}$$

n = 0.625 × 10^{19} = 6.25 ×10^{18}

10. How many electrons are there in 2C of charge?

Answer: $n = \frac{Q}{e}$

$$n = \frac{2C}{1.6 \times 10^{19}} = \frac{20 \times 10^{19}}{16}$$

n = 1.25 × 10^{19}

= 12.5 ×10^{18}

11. Define SI unit of current.

Answer: 1 ampere is defined as IC of charge flowing through an area in 1 second of time.

12. What is an ammeter and how is it connected in an electric circuit?

Answer: An ammeter is a device that measures electric current in a circuit and is connected in series because it has law resistance.

13. Define potential difference

Answer: Potential difference between any two points in a circuit carrying some current is defined as the work done to move a unit charge from one place to the other.

14. Define electric potential at a point?

Answer: Electric potential at a point is defined as the work done in bringing a charge from infinity to that point.

15. What is a voltmeter? How is it connected in a circuit?

Answer: Voltmeter is a device which measures potential difference in a circuit. It is connected in parallel because of its high resistance.

16. Name a device that helps to maintain potential difference across a conductor?

Answer: Battery or cell

17. What makes an electron to move in conductor?

Answer: Potential difference makes electron move in a conductor.

18. Give the relationship between p.d., work done and charge.

Answer:

$$V = \frac{W}{Q}$$

19. Define SI unit of potential difference.

Answer: I volt is defined as the potential difference between two points in a current carrying conductor when IJ of work is done to move IC of charge from one point to other.

20. What is meant by saying that the potential difference between two points is IV?

Answer: Potential difference between two point is IV means that IJ of work has to be done to bring 1C of charge from one point to the other.

21. How much energy is given to each coulomb of charge passing through a 6V battery?

Answer:

(V) = 6V

Q = IC

E = W = VQ

= 6 × 1 = 6J

22. Name the physical quantities represented by the following?

Answer:

a) Electric current

b) Potential difference

23. How much work is done in moving a charge of 3C across two points having a potential difference of 6V?

Answer:

V = 6V

Q = 3C

W = VQ

= 6 × 3 = 18J

24. How much work is done in moving a charge of 4C across two points having a potential difference of 6V?

Answer:

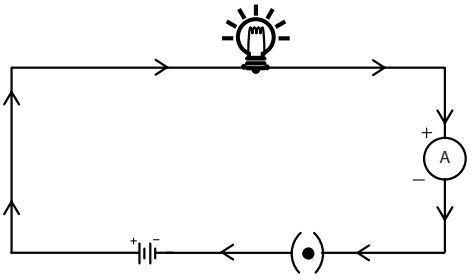
Q = 4C

V = 6V

W = VQ

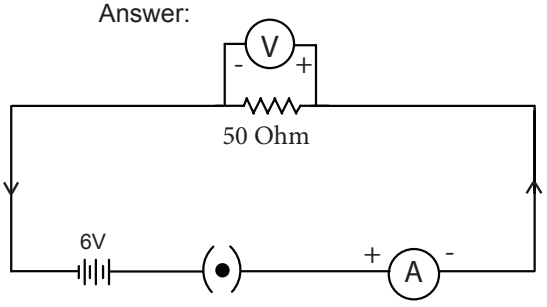
= 6 × 4 = 24J

25. Draw a circuit which consist of battery of 2 cells key, bulb and an ammeter.



26. Draw a schematic diagram of a circuit consisting of a battery of three cells of 2V each. A 50hm resistor, an ammeter and a voltmeter across a resistor and a switch.

Answer:



27. State ohm's law and give its mathematical expression.

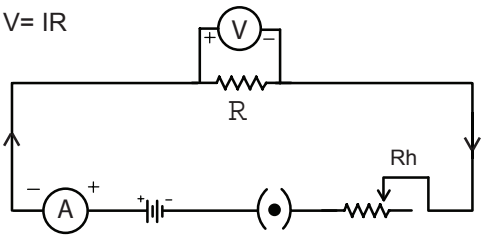
Answer: Ohm's law states that the potential difference between the ends of a conductor in a current carrying circuit is directly proportional to the electric current flowing through it provided its temperature remains the same.

V = IR

28. Draw the circuit diagram to verify Ohm's law

Answer:

V= IR



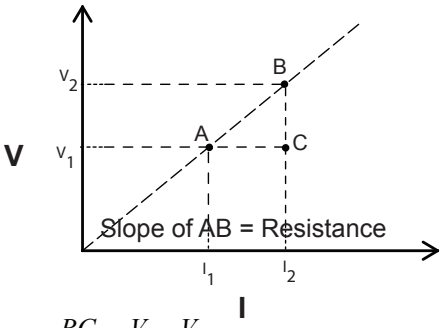
29. What do the following represent

Answer:

a) slope of V-1 graph— resistance (R)

b) slope of I-V graph — reciprocal of resistance(I/R)

30. Draw V.I graph and show how to calculate resistance.
Answer:



$$R = \frac{BC}{AC} = \frac{V_2 - V_1}{I_2 - I_1}$$

31. Define SI unit of resistance (ohm)
Answer: 1 ohm is defined as the resistance of a conductor, whose potential difference across its ends is I V and the current following through it is 1A.

32. What is a rheostat?
Answer: It is a device which is used to change the resistance in a circuit without changing the voltage source.

33. What are the factors on which resistance of a conductor depends?

Answer: 1. Length of the conductor (L)
2. Area of cross section (A)
3. Nature of the material of the conductor
4. Temperature (T)

34. Give the SI unit of resistivity.
Answer: Ohm metre (Ωm)

35. The resistivity of copper wire of 5Ω resistance is $1/62 \times 10^{-8}\ \Omega$ –m.

(a) What is the resistivity of it if its resistance is increased to 10Ω, at same temperature?

(b) If temperature of the wire increases what will happen to its resistivity?

Answer: a) Resistivity will not change because of the same temperature. It remains the same

b) When temperature increases resistivity will increase.

36. Define resistivity?
Answer: The resistance of a conductor of unit length and unit area of cross section is called resistivity.

37. Two materials of resistivity 5.2×10^{-8} Ωm and 10^{12}Ωm. identify the type of material as conductor and insulator.

Answer: Here, conductor is of resistivity of $5.2 \times 10^{-8}\Omega$m
Insulator is of resistivity of $10^{12}\Omega$m.

38. Will current flow more easily through a thick wire or a thin wire of the same material, when connected to the same source? Why?

Answer: Current flow more easily through a thick wire. Because

$$I \alpha \frac{1}{R} \quad \text{and} \quad R \alpha \frac{1}{A}$$

When area of cross section is more it has less resistance and more current will flow in the thick wire.

39. Let the resistance of an electrical component remains constant while the potential difference across the two ends of the component decreases to half of it former value. What change will occur in the current through it?

Answer: By ohm's law, V α I so when potential difference became half and resistance remains the same current will also become half of the original value.

By ohm's law, $I = \frac{V}{R}$

R = R

V new = $\frac{V}{2}$

I = ?

$$I\,new = \frac{V\,new}{R} = \frac{V/2}{R} = \frac{1}{2}\frac{V}{R} = \frac{1}{2} \times I$$

40. How much current will an electric bulb draw from a 220V source, if the resistance of the bulb is 1200Ω?
Answer: V = 220V

R = 1200 Ω

$$I = \frac{V}{R} = \frac{\cancel{220}^{11}}{\cancel{1200}_{60}}$$

$$= 0.18\bar{3}\,A$$

41. The potential difference between the terminals of an electric heater is 60V when it draws a current of 4A from the source. What current will the heater draw if the p.d is increases to 120V?
Answer : Case I, V1 = 60 V

I_1 = 4A

Resistance of heater,

$$R = \frac{V}{I_1} = \frac{60}{4} = 15\Omega$$

Case II, V_2 = 120V

R = 15Ω

$$I_2 = \frac{V_2}{R} = \frac{120}{15} = 8A$$

42. Calculate the resistivity of the material of a wire 1m long, o.4mm in diameter and having a resistance of 2Ω.
Answer:

$\ell = \ell$m , d = 0.4mm, R = 2 Ω, ρ = ?

$$\rho = \frac{RA}{\ell}$$

$A = \pi r^2$

$d = 0.4mm = 0.4 \times 10^{-3}m$

$r = 0.2 \times 10^{-3}m$

$A = 3.14 \times 0.2 \times 0.2 \times 10^{-6}$

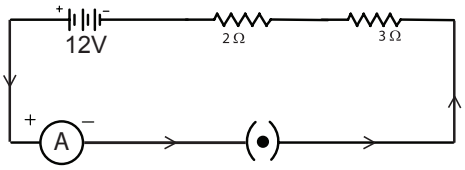
$$\rho = \frac{2 \times 3.14 \times 0.2 \times 0.2 \times 10^{-6}}{1m} = 2.512 \times 10^{-5}\ \Omega m$$

43. Why are the coils of electric toasters and electric irons made of an alloy rather than a pure metal?

Answer: The coils of electric toasters and electric ions are made of alloy because alloys have higher resistivity than their constituents and they do not get oxidized at high temperature.

44. Draw a circuit diagram where a battery of 12V, 2Ω resistor, a 3Ω resistor and a switch all connected in series. Calculate the amount of current flowing through the circuit.

Answer:



$R_1 = 2\Omega$, $R_2 = 3\Omega$

$R_2 = 5\Omega$, p.d = 12V

$$I = \frac{V}{R} = \frac{12}{5} = 2.4A$$

45. Judge the equivalent resistance when the following are connected in parallel 1Ω and 106Ω.

Answer: Since they are in parallel the total resistance will be less than the smallest resistance i.e, 1Ω ,

$R_p < 1\Omega$

47. What is a) the highest b) the lowest total resistance that can be secured by combinations of four coils of resistance 4Ω, 8Ω, 12Ω, 24Ω?

Answer: To get maximum resistance resistors should be connected in series.

$R_ç = R_1 + R_2 + R_3 + R_4 = 4 + 8 + 12 + 24 = 48\Omega$.

To get the lest resistance, connect the resistors is parallel.

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4} = \frac{1}{4} + \frac{1}{8} + \frac{1}{12} + \frac{1}{24}$$

$$= \frac{6+3+2+1}{24} = \frac{12}{24} = \frac{1}{2}$$

Lowest resistance = $R_p = 2\Omega$

48. A wire of resistance 5m is bent in the form a circle to form a closed circuit. What is the resistance between two points at the end of a diameter?

Answer: The two halves of the wire are connected in parallel. Each part has a resistance of .

$\frac{5}{2}\Omega$

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{2.5} + \frac{1}{2.5} = \frac{20}{25} = \frac{4}{5}$$

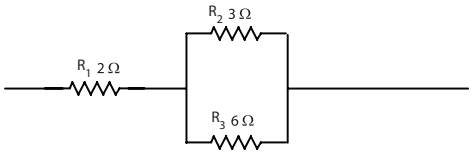
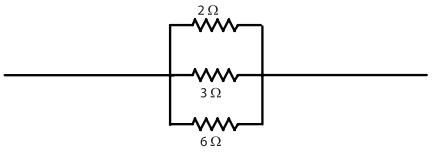
$$R_p = \frac{5}{4}$$

R_p = 1. 25Ω.

46. How can three resistors of resistances 2Ω, 3Ω and 6Ω be connected to obtain a total resistance of a) 4Ω, b) 1Ω?

Answer:

$R_1 = 2\Omega$, $R_2 = 3\Omega$, $R_3 = 6\Omega$

To get 4Ω	To get 1Ω
	
$\frac{1}{R_p} = \frac{1}{3} + \frac{1}{6} = \frac{2+1}{6} =$ $R_p = 2\Omega$ $R_1 + R_p = 2 + 2 = 4\Omega$	$\frac{1}{R_p} = \frac{1}{2} + \frac{1}{3} = \frac{1}{6} = \frac{1}{1}$ $R_p = 1\Omega$

49. Compare the series and parallel connection of devices with a battery.

Answer:

Series	Parallel
1. Same amount of current flows through each device.	1.Different amount cur rent is provided to different devices according to their need.
2. Potential difference across each device is different.	2. Potential difference across each device is the same
3. Only 1 switch is provided for all the devices.	3. Different switches can be provided for different instrument.
4. Total resistance is more than the component resistors.	4. Total resistance will be less than the component resistors.
5. If one device stops working others will also stop.	5. If one device stops working others will contin ue working.

50. Why is series arrangement not used for domestic circuits?

Answer:

* Different devices need different amount of current but series circuit provide same amount of current to all.
* If one device stops working others may not work.
* Different devices get different amount of p.d.
* Total resistance in the circuit will be more.

51. What do you mean by heating effect of electric current?

Answer: When electric current flows through a resistor heat is produced in it. This effect is called heating effect of electric current.

52. State Joules law of heating?

Answer: Joules law of heating states that heat produced in resistor is 1) directly proportional to the square of current for a given resistance, ii) directly proportional to resistance for a current and iii) directly proportional to the time for which the current flows through the resistor.

53. An electric iron of resistance 20m takes a current of 5A. Claculate the heat developed in 30s.

Answer:

$t = 30s, I = 5A$

$R = 20\Omega,$

$H = I^2Rt$

$= 5^2 x\ 20 \times 30 = 25 \times 20 \times 30 = 25 \times 600$

$= 15000\ J = 15kJ$

54. Find the heat generated while transferring 96000C of charge in one hour through a.p.d of 50V.

Answer: $Q = 96000C, V = 50V, t = 1hr$

Heat = Work done

$H = VQ$

$= 50 \times 96000 = 4800000J$

$= 4.8 \times 10^6 J$ or $= 4800kJ$

55. What is a fuse & how is it connected in a circuit? Name some metals used to make fuse wire?

Answer: Fuse is a safety device used in an electrical circuit which is made of a metal or an alloy of appropriate melting point. It is always connected in series in an electric circuit. Copper, aluminum, iron and lead are some metals used to make fuse wire.

56. How does a fuse work?

Answer: If a current larger than the specified value flows through the circuit, the temperature of the fuse wire increases. This melts the fuse wire and breaks the circuit. Thus protect the circuit.

57. An electric iron is rated 220v-1000W. What is the resistance of its element? What is the maximum value of the current which can pass through it? Find the rating of the fuse to be used.

Answer:

P = 1000 W, V= 220, R = ? , I = ?

P = VI

$$I = \frac{P}{V} = \frac{\cancel{1000}^{50}}{\cancel{220}_{11}} = 4.54A$$

We have to use the fuse 5A

58. Define S.I unit of electric power.

Answer: One watt is defined as the power consumed by a device that carries I A of current when operated at a potential difference of I V.

59. Define one watt hour.

Answer: One watt hour is defined as the energy consumed when 1 watt of power is used for one hour.

60. Name the commercial unit of energy.

Answer: Commercial unit of energy is kilo watt hour (kWh).

61. Convert commercial unit of energy into S.I unit.

Answer:

Commercial unit of energy = kWh

S. I unit = joule

1 kWh = 1000 Wh

$= 1000 \times 3600\ s \times J/s = 3.6 \times 10^6\ J$

62. An electric bulb is connected to a 220V source. The current drawn is 0.75A. Find the power of the bulb.

Answer:

V = 220V, I = 0.75A, P = ?

P = VI

= 220 × 0.75= 165 W

63. An electric heater rated 500 W and a bulb rated 60W are used for 5 hours/day. Calculate the total energy consumed by the in the month of September in kWh. Find the cost of energy consumed at rate of Rs. 5 per unit.

Answer:

$P_1 = 500$ W, $P_2 = 60$ W

$t = 5 \times 30 = 150$ h

Energy used by heater $E_1 = P_1 t$

$= 500 \times 150 = 75000$Wh

$= 75$ kWh

Energy used by bulb, $E_2 = P_2 t$

$= 60 \times 150 = 9000$Wh $= 9$ kWh

$E = E_1 + E_2 = 84$kWh$= 84$ unit

Cost per unit = 5

Total cost = No. of units × ₹ 5 = 84 × 5 = ₹ 420

64. An electric motor takes 5A current from a 220V source. Find the power of the motor and energy consumed for 2h.

Answer:

I = 5A, V = 220 V, t = 2h

P = VI = 5 × 220 = 1100W

E = Pt = 1100 × 2 = 2200Wh = 22kWh

= 2.2 units

65. Why do we connect an ammeter in series and a voltmeter in parallel?

Answer: An ammeter is connected in series because it has law resistance and a voltmeter is connected in parallel because it has high resistance.

66. An electric bulb is rate 220V and 100W. When is operated on 110V, what will be its power?

Answer:

$P_1 = 100$W, $V_1 = 22$V, R = ?

$$P = \frac{V^2}{R}$$

$$R = \frac{V^2}{P_1} = \frac{220 \times 220}{100}$$

$= 484\Omega$

$V_2 = 110$V, $R = 484\Omega$

$$P = \frac{V^2}{R}$$

$$= \frac{110 \times 110}{484} = \frac{100}{4}$$

= 25W

67. Why is tungsten used exclusively for filament of electric lamps?

Answer: Tungsten is used exclusively for filament of electric lamps because of its high resistivity and high melting point. (3380°C)

68. How does resistance of a wire vary with its area of cross-section?

Answer: Resistance is inversely proportional to area of cross section ($R\alpha 1/A$). So resistance increases when area of cross decreases and vice versa.

69. Why are copper and aluminium wires usually used for electric transmission?

Answer: Copper and aluminium wires usually used for electric transmission because they are very good conductors of electricity due to low resistance.

70. Which used more energy, a 250W TV set in 1h or a 1200W toaster in 10 minutes?

Answer:

$P_1 = 250$ W, $t_1 = 1$h

$E_1 = P_1 t_1 = 250 \times 1$

$= 250$ Wh

$P_2 = 1200$W, $t_2 = 10$ min $= \frac{1}{6}$h

$E_2 = P_2 \times t_2$

$= 1200 \times \frac{1}{6} = 200$ Wh

So TV uses more energy.

71. An electric heater of resistance 8Ω draws 15A from a service mains for 2h. Find the rate at which heat is developed in the heater.

Answer:

R= 8Ω, I = 15A, t = 2h

Rate at which energy consumed is power.

$$\frac{E}{t} = P = I^2 R$$

= 15 ×15×8=1800W

72. A battery of 9V connected in series with resistors of 0.2Ω, 0.3Ω,0.4Ω, 0.5Ω and 12Ω respectively. How much current will flow through the 12Ω resistor?

Answer: Since the resistors are in series, same current will flow through each resistors.

V = 9 V

$R_s = R_1 + R_2 + R_3 + R_4 + R_5$

$= 0.2 + 0.3 + 0.4 + 0.5 + 12 = 13.4\Omega$

$$I = \frac{V}{R} = \frac{9}{13.4} = \frac{90}{134} = 0.67A$$

73. How many 176 Ω, resistors in parallel are required to carry 5A and on 220V line? (NCERT) ,

I = 5A, V = 220V N = ?, R_P = ?

Answer:

$$R_P = \frac{V}{I} = \frac{220}{5} = 44\ \Omega$$

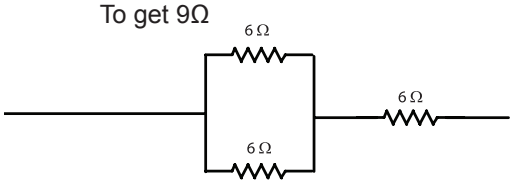
Number of resistors = $\frac{R}{R_p}$

$$= \frac{176}{44} = 4$$

74. Show how would you connect three resistors, each of resistance 6ohm, so that the combination has resistance of i) 9Ω , ii) 4Ω

R_1 = 6Ω, R_2 = 6Ω, R_3 = 6Ω

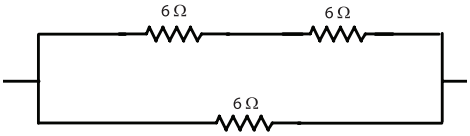
To get 9Ω



$$R_p = \frac{R_1 R_2}{R_1 + R_2} = \frac{6 \times 6}{6+6} = \frac{36}{12} = 3\Omega$$

$R_s = R_p + R_3 = 3 + 6 = 9\Omega$

To get 4Ω



$R_s = 6 + 6 = 12\Omega$

$$\frac{1}{R_{total}} = \frac{1}{12} + \frac{1}{6}$$

$$R_{total} = \frac{R_1 R_2}{R_1 + R_2} = \frac{12 \times 6}{12+6} = \frac{72}{18} = 4\Omega$$

75. Several electric bulbs designed to be used on a 220V electric supply line, are rated 10W. How many lamps can be connected in parallel with each other across the two wires 220V line of the maximum allowable current is 5A?

Answer:

Power of 1 bulb = 10W

V = 220 V

Resistance of 1 bulb = $\frac{V^2}{p}$

$$= \frac{220 \times 220}{10} = 4840\ \Omega$$

Max current in circuit = 5A

Total resistance = $\frac{V}{I} = \frac{220}{5} = 44\Omega$

Let n be the no of bulbs

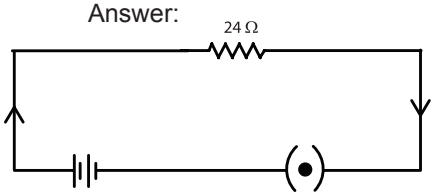
$$n = \frac{R}{R_p} = \frac{4840}{44}$$

= 110

76. A hot plate of an electric oven connect to a 220V line has to resistance coils A and B, each of 24Ω, resistance, which may be used separately in series, or in parallel, What are the current in the three cases?

Case 1

Answer:

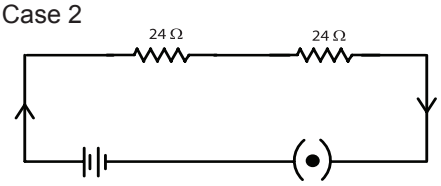


V = 220V, R1 = 24Ω

$$I_1 = \frac{V}{R_2}$$

$$= \frac{220}{24} = 9.16A$$

Case 2

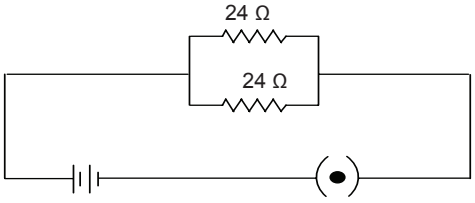


R_s = 24 + 24 + 48Ω

$$I_2 = \frac{V}{R_s} = \frac{220}{48}$$

= 4.58A

Case 3



$$R_p = \frac{R_1 R_2}{R_1 + R_2} = \frac{24 \times 24}{48}$$

$$= \frac{24 \times 24}{48} = 12\ \Omega$$

$$I_3 = \frac{V}{R_p} = \frac{220}{12} = 18.33\text{A}$$

77. A copper wire has diameter 0.5mm and resistivity of 1.6 × 10–8Ω. What will be the length of the wire to make its reistance 10Ω?

d = 0.5 mm

r = 0.25 × 10^{-3}m

ρ = 1.6 × 10^{-8}Ωm

r = 10Ω

l = ?

Answer:

$$R = \frac{\rho \ell}{A}, \qquad \ell = \frac{RA}{\rho}$$

$$l = \frac{10 \times \rho\pi r^2}{1.6 \times 10^{-8}}$$

$$= \frac{10 \times 3.14 \times 0.25 \times 0.25 \times 10^{-6}}{1.6 \times 10^{-8}}$$

= 1.226 × 10^2 m

= 122.72m

78. Two lamps, one rated 100W at 220V, the other 60W at 220V are connected in parallel to electric mains supply. What current is drawn from the line if the supply voltage is 220V?

Answer:

V_1 = 220V

P_1 = 100V

$P_1 = VI_1$

$$I_1 = \frac{P_1}{V} = \frac{100}{220}$$

$$= \frac{5}{11} A$$

V_2 = 220V

P_2 = 60W

$$I_2 = \frac{P_2}{V}$$

$$I_2 = \frac{60}{220} = \frac{3}{11}$$

Total current

$I = I_1 + I_2$

$$= \frac{5}{11} + \frac{3}{11} = \frac{8}{11} = 0.724\text{A}$$

79. What will happen to the amount of current flowing in a circuit, if two resistors connected in series are changed to parallel?

Answer: Since the total resistance in parallel is less than that in series, the amount of current will increase.

Because $I \alpha \frac{1}{R}$

80. An electric bulb is rated 100W-220V. What do you understand by this statement?

Answer: This statement means that the rate at which energy consumed is 100W when the p.d is 220V.

81. Why does the cord of an electric heater not glow while the heating element does?

Answer: Cord of an electric heater is made up of thick copper wire which has much lower resistance that is heating element. For the same current flowing through the cord and the element, heat produced in the element is much more than that of a cord (H= I^2Rt). So, the element becomes very hot and it glows, whereas chord does not become hot and it does not glow.

82. Differentiate between the unit 'watt' (W) and watt-hour (Wh)?

Answer: Watt represents the S.I units of power and watt hour represents the SI unit of energy.

83. Derive Joules law of heating .

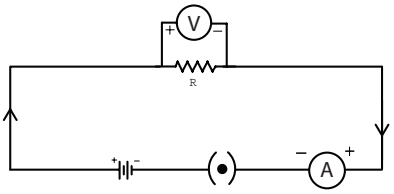
Answer: Consider a resistor of resistance R through which a current of I is flowing and p.d across is V. If Q amount of charge is flowing for t seconds then the work done for it is given by W = VQ.

Then the power input to the circuit by the source is

$P = \frac{W}{t} = \frac{VQ}{t} = V \cdot \frac{Q}{t} = V \cdot \frac{It}{t} = VI$ So the energy supplied in the circuit in time t seconds E = Pt = VIt

= IRIt [V = IR]

E = I^2Rt

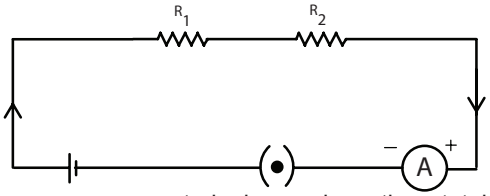


This energy is dissipated in the form of heat. Therefore, H = I^2Rt. This is Joules law of heating.

COMBINATION OF RESISTORS

There are two methods of joining two or more resistors together in a circuit.

1. In series

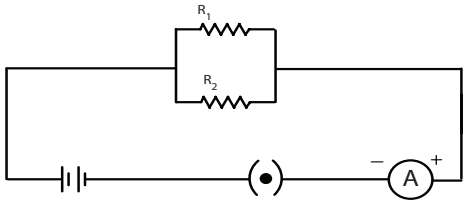


$R_S = R_1 + R_2$

*When resistors are connected in series the total resistance will be more than the highest resistance.

2. In parallel

$$R_p = \frac{R_1 \times R_2}{R_1 + R_2}$$



*When resistors are connected in parallel the total resistance will be less thaneach individual resistance.

84. Two resistors of 6Ω and 3Ω are connected in parallel in a circuit. Find the effective resistors.

$R_1 = 6\Omega$, $R_2 = 3\Omega$

$R_p = ?$

Answer: $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{6} + \frac{1}{3}$

$$\frac{1}{R_p} = \frac{1+2}{6} = \frac{3}{6} = \frac{1}{2}$$

$R_p = 2\Omega$

85. Two resistors of 8Ω and 2Ω are connected in parallel is a circuit. Find the total resistance.

R1 = 8Ω, R2 = 2Ω

Rp = ?

Answer:

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{8} + \frac{1}{2}$$

$$= \frac{1+4}{8} = \frac{5}{8}$$

$$\frac{1}{R_p} = \frac{5}{8}$$

$$R_p = \frac{8}{5} = 1.6W$$

$$R_p = \frac{8}{5} = 1.6\Omega$$

NCERT SOLUTIONS (ELECTRICITY)

Page no. 209

Q.5. Use the data in table 12.2 to answer the following

a) Which among iron and mercury is a better conductor?

b) Which material is the best conductor?

Answer :

a) Resistivity of Iron = 10.0×10^{-8} Ωm

Resistivity of mercury = 94.0×10^{-8} Ωm

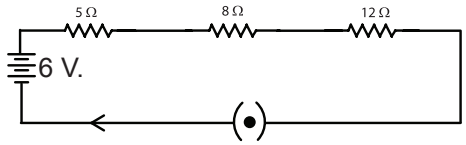
Resistivity of mercury is more than that of iron. This implies that iron is a better conductor than mercury.

b) It can be observed from Table 12.2 that the resistivity of silver is the lowest among the listed material. Hence it is the best conductor.

Page no. 213

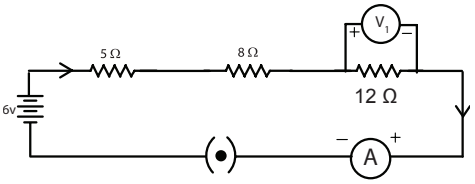
1. Draw a schematic diagram of a circuit consisting of a battery of three cells of 2 V each a 5Ω resistor and 8Ω resistor and 12Ω resistor and plug key all connected in series.

Answer : Three cells of potential 2 V, each connected in series therefore the potential difference of the battery will be 2 V + 2V + 2V = 6 V. The following circuit diagram shows three resistors of resistance 5 Ω, 8Ω and 12 Ω respectively connected in series and a battery of potential 6 V and plug key which is closed means the current is flowing in the circuit.



2**. Redraw the circuit question no. 1 putting in an ammeter measure the circuit through the resistors and a voltmeter to measure the potential difference across the 12Ω resistor. What would be the reading in the ammeter and voltmeter?**

An ammeter should be connected in the circuit is series with the resistors. To measure the potential across the resistor. It should be connected in parallel as shown in following figure.



The resistance are connected in series ohm's law can be used to obtain the readings of ammeter and voltmeter according to ohm's law

V=IR

Where, potential difference V=6V

Current flowing through the circuit = I

Resistance of the circuit R= 5+8+12 = 25 Ω

$I = \frac{V}{R} = \frac{6}{25} = 0.24A$

Potential difference (PD) across 12 Ω resistor = V_1

Current flowing through the 12 Ω resistor

I = 0.24 A.

Therefore using ohm's law, we obtain

$V_1 = IR = 0.24 \times 12 = 2.88$ V

∴ The reading of ammeter will be = 0.24 A

The reading of voltmeter will be = 2.88 V

Page No. 216

1. Judge the equivalent resistance when the following are connected in parallel a) 1Ω and 10^6Ω b) 1Ω and 10^3Ω and 10^6Ω.

Answer :

a) When 1Ω and 10^6Ω are connected in parallel

Let R be the equivalent resistance

$$\therefore \frac{1}{R} = \frac{1}{1} + \frac{1}{10^6}$$

$$\frac{1}{R} = \frac{1+10^6}{10^6}$$

$$R = \frac{10^6}{1+10^6} = \frac{10^6}{10^6} = 1\Omega$$

Therefore equivalent resistance = 1Ω

b) When 1Ω, 10^3 Ω and 10^6 Ω are connected in parallel

Let R be the equivalent resistance

$$\frac{1}{R} = \frac{1}{1} + \frac{1}{10^3} + \frac{1}{10^6}$$

$$\frac{1}{R} = \frac{10^6 + 10^3 + 1}{10^6}$$

$$R = \frac{10^6}{10^6 + 10^3 + 1}$$

$$R = \frac{1000000}{1001001} = 0.999\Omega$$

Therefore equivalent resistance = 0.999 Ω

2. An electric lamp of 100 Ω a toaster of resistance 50Ω and water filter of resistance 500Ω are connected in parallel to a 220V source. What is the resistance of an electric iron connected to the same source that take as much current as all three appliances and what is the current through it?

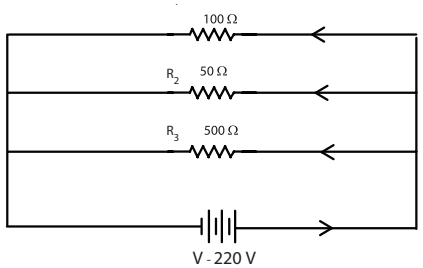
Answer : Resistance of electric lamp R_1 = 100 Ω

Resistance of toaster R_2 = 50Ω

Resistance of water filter R_3 = 500 Ω

Potential difference of the source V = 220 V

These are connected in parallel as shown in following figure



Let R be the equivalent resistance of the circuit

$$\frac{1}{R} = \frac{1}{R^1} + \frac{1}{R^2} + \frac{1}{R^3} = \frac{1}{100} + \frac{1}{50} + \frac{1}{500} = \frac{16}{500}$$

According to ohm's law

V= IR

I = V/R

Where, current flowing through the circuit I

$$I = \frac{V}{R}$$

$$= \frac{220}{\frac{500}{10}} = \frac{220/16}{50} = 7.04A$$

7.04A of current is drawn by all the three given appliances. Therefore current drawn by an electric iron connected to the same source of potential 220 V = 7.04 A

Let R^1 be the resistance of the electric iron : According to ohm's law

$$V = 1R^1$$

$$R^1 = \frac{V}{1} = \frac{220}{7.04} = 31.25\Omega$$

Therefore the resistance of the electric iron is 31.25Ω and the current flowing through it is 7.04Ω

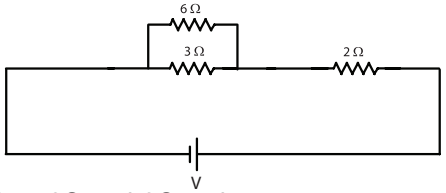
3. What are the advantages of connecting electrical device in parallel with the battery instead of connecting them in series?

Answer : There is no division of voltage among the appliances when connected in parallel. The potential difference across each appliance is equal to the supplied voltage. The total effective resistance of the circuit can be reduced by connecting electrical appliances in parallel.

4. How can three resistors of resistance 2 Ω, 3Ω and 6 Ω be connected to give a total resistance of a) 4Ω, b) 1Ω ?

Answer : There are three resistors of resistance 2Ω, 3Ω and 6Ω respectively.

a) The following circuit diagram shows the connecters of three resistors



Here 6Ω and 3Ω resistors are connected in parallel. The equivalent resistance given by

$$\frac{1}{R} = \frac{1}{6} + \frac{1}{3}$$

$$\frac{1}{R} = \frac{6+3}{6 \times 3}$$

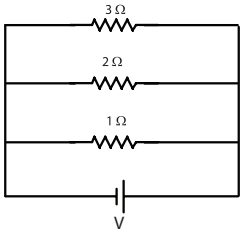
$$R = \frac{6 \times 3}{6+3} = \frac{18}{9} = 2\Omega$$

This equivalent resistor of resistance 2Ω is connected to a 2Ω resistor in series. Therefore, the equivalent resistance

of the circuit = 2Ω +2Ω = 4Ω

Hence the total resistance of the circuit is 4Ω

b) The following circuit diagram shows the three resistors.



All the resistors are connected. Therefore their equivalent resistance will be given as

$$\frac{1}{R}=\frac{1}{2}+\frac{1}{2} \quad \frac{}{2}=\frac{3+2}{6} \quad =\frac{1}{3}+2 \qquad =\frac{6}{} \; = \; 1\,\Omega$$

Therefore the total resistance of the circuit is 1Ω

5. What is (a) the highest, (b) the lowest total resistance that can be secured by combinations of four coils of resistance 4Ω, 8Ω, 12Ω, 24Ω

Answer : There are four coils of resistance 4Ω, 8Ω, 12Ω and 24Ω and respectively

a) If these coils are connected in series then the equivalent resistance will be the highest given by sum = 4+8+12+24 = 48Ω

b) If these coils are connected in parallel, then the equivalent resistance will be the lowest given by

$$R = R_1 \; R_2 \; R_3 \; R_4$$

$$\frac{1}{R} = \frac{1}{4}+\frac{1}{8}+\frac{1}{12}+\frac{1}{24}=\frac{6+3+2+1}{24}$$

$$\frac{1}{R} = \frac{12}{24} \therefore R = \frac{24}{12} = 2\,\Omega$$

Therefore 2Ω is the lowest total resistance.

Page no. 218

1. Why does the cord of an electric heater not glow while the heating element does?

Answer : The heating element of the heater is made up of alloy which has very high resistance. So when current flows through the heating element, it be becomes too hots and glows red. But the resistance of cord which is usually of copper or aluminum is very low. So it doesn't glow.

3. An electric iron of resistance 20Ω takes a current of 5A. Calculate the heat developed in 30s.

Answer : The amount of heat (H) produced is given by the joule's law of heating as H = VIT or I^2Rt

Current I = 5A

Time t= 30S

Voltage V = Current x Resistance = 5 x 20 = 100 V

H = 100 x 5 x 30 = 1.5 x 10^4 J

Page no 220

1. What determines the rate at which energy is delivered by a current?

Answer: The rate of consumption of electric energy in an electric appliances is called electric power. Hence the rate at which energy is delivered by a current is the power of the appliances

2. An electric motor takes 5A from a 220 V line. Determine the power of the motor and the energy consumed in 2h

Answer : Power (P) is given by the expression

P= VI

Where,

Voltage, V = 220V

Current, I = 5A

P = 220 x 5 = 1100 Wh

Energy consumed by the motor = Pt

Time (t) = 2h = 2 x 60 x 60 = 7200 s

∴ P = 100 x 7200 = 7.92 x 10^6J

or

E=Pt =1100W x 2h = 2200Wh

Page no. 221

2. Which of the following terms does not represent electrical power in a circuit?

a) 1^2R b) $1R^2$

c) VI d) V^2/R

Answer : b) $1R^2$

3. An electric bulb is rated 220V and 100 W. When it is operated on 110 V, the power consumed will be

a) 100W b) 75W

c) 50W d) 25W

Answer : d) 25W

4. Two conducting wires of the same material and of equal length and equal diameters are first connected in series and then parallel in a circuit across the same potential difference. The ratio of heat produced in series and parallel combination would be.

a) 1:2 b) 2:1 c) 1:4 d) 4:1

Answer : c) 1:4

5. How is voltmeter connected in the circuit to measure the potential difference between two points?

Answer : To measure the potential difference between two points, a voltmeter should be connected in parallel to the points.

6. A copper wire has diameter 0.5 mm and resistivity of 1.6 x 10^{-8} Ωm. What will be the length of this wire to make its resistance 10Ω. How much does the resistance change if the diameter is doubled?

Answer : Area of cross section of wire, A=Π $(d/2)^2$

Diameter = 0.5mm = 0.0005m

Resistance R = 10Ω

We know that

$$R = \frac{\rho \ell}{A}$$

$$\ell = \frac{RA}{\rho} = \frac{10 \times 3.14 \times \left(\frac{0.0005}{2}\right)^2}{1.6 \times 10^{-8}}$$

$$= \frac{10 \times 3.14 \times 25}{4 \times 1.6} = 122.72 \text{ m}$$

Length of the wire = 122.72 m

If the diameter of the wire is doubled, new diameter

= 2 x 0.5 = 1mm = 0.001m

Let new resistance be R^1

$$R^1 = \frac{\rho \ell}{A}$$

$$= \frac{1.6 \times 10^{-8} \times 122.72}{\Pi(1/2 \times 10^{-3})^2}$$

$$= \frac{1.6 \times 10^{-8} \times 122.72 \times 4}{3.14 \times 10^{-6}}$$

$$= 250.2 \times 10^{-2} = 2.5\Omega$$

Therefore the length of the wire is 122.7m and the new resistance is 2.5Ω

7. The values of current I flowing in a given resistance for the corresponding values of potential difference V across the resistor are given below

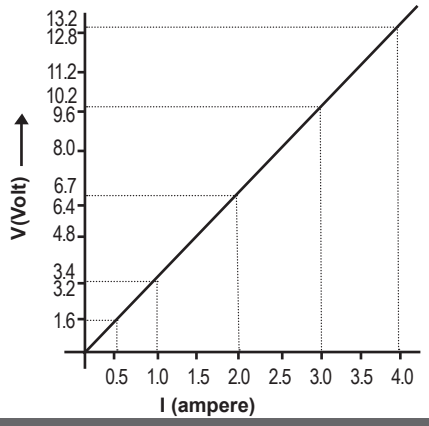
I (ampere)	0.5	1.0	2.0	3.0	4.0
V(volts)	1.6	3.14	6.7	10.2	13.2

Plot a graph between V and I and calculate the resistance of that resistor.

The plot between Voltage and Current is called IV characteristics. The voltage is plotted on X – axis and current is plotted on Y –axis. The values of the current for different values of the voltage are shown in given table.

I (ampere)	0.5	1.0	2.0	3.0	4.0
V(volts)	1.6	3.14	6.7	10.2	13.2

plot a graph between V and I and calculate the resistance of that resistors



The slopes of the line gives the values of resistance (R) as

Slope 1/R = BC/AC = $\frac{2}{6.8}$

$\frac{6.8}{2}$ = 3.4Ω

8. When a 12V battery is connected across an unknown resistor, there is a current of 2.5 in the circuit. Find the value of the resistance of the resistor.

Answer : Resistance (R) of a resistor given by ohm's law as V=1R

$$R = \frac{V}{I}$$

Where potential difference V=12V

Current in the circuit I = 2.5 mA = 2.5×10^{-3} A

$$R^1 = \frac{12}{2.5 \times 10^{-3}} = 4.8 \times 10^3\ \Omega = 4.8\ k\Omega$$

Therefore the resistance of the resistor is 4.8 kΩ

9. A battery 9 V is connected in series with resistors of 0.2Ω, 0.3Ω, 0.4Ω, 0.5Ω and 12Ω respectively. How much current would flow through the 12Ω resistor.

Answer: There is no current division occurring in a series circuit. Current flow through the component is the same given by ohms law as

V = IR

I = V/R

Where R is the equivalent resistance of resistance 0.2Ω , 0.3Ω , 0.4Ω , 0.5Ω and 12Ω . These are connected in series. Hence the sum of the resistance will give the value of R

R = 0.2 + 0.3 + 0.4+ 0.5+ 12 = 13.4Ω

Potential difference, V=9V

I = 9/13.4 = 0.671A

Therefore the current that would flow through the 12Ω resistor is 0.671A

10. How many 176Ω resistor (in parallel) are required to carry 5A on a 22V line?

Answer : For X number of resistors of resistance 176Ω the equivalent resistance of the resistors connected in parallel is given by ohm's law

As V = 1R

R = V

Where supply voltage V = 220V

Current, I = 5A

Equivalent resistance of the combination

R given as

$$\frac{1}{R} = X \times \frac{1}{176}$$

$$= \frac{176}{X}$$

From, ohm's law $\frac{V}{1} = \frac{176}{X}$

$$X = \frac{176 \times 1}{V} = \frac{176 \times 5}{220} = 4$$

Therefore four resistors of 176Ω are required to draw the given amount of current.

MATHEMATICS

CHAPTER 1

REAL NUMBERS

EUCLID'S DIVISION LEMMA

An algorithm is a series of well defined steps which give a procedure for solving a type of problem.

A lemma is a proven statement used for proving another statement.

Euclid's division algorithm is an alternative method to calculate HCF

To obtain HCF of two positive integers say c and d with c > d

Step 1 : Apply Euclid's division lemma, to c and d. So we find whole numbers q and r such that c=dq+r 0≤ r < d.

Step 2 : If r = 0, d is the HCF of c and d. If r ≠ 0, apply the division lemma o d and r.

Step 3 : Continue the process till the reminder is zero. The divisor at this stage will be the required HCF.

The fundamental Theorem of Arithmetic

- Every composite number can be expressed (factorised) as a product of primes and this factorisation is unique, apart from the order in which the prime factors occur.

Rational and Irrational Numbers

- A number 's' is called rational if it can be written in $\frac{p}{q}$ from where q≠ 0
- A number 's' is called irrational of it can't be written in $\frac{p}{q}$ from where q≠ 0

Irrationality of square roots of 2, 3 and 5

- Let p be a prime number. If 'p' divides a^2 , then 'p' divides 'a', where 'a' is a positive integer.
- $\sqrt{2}$,$\sqrt{3}$, $\sqrt{5}$ are irrational.

Decimal expressions of rational numbers

- Let 'x' be a rational number, whose decimal expansion terminates. Then we can express 'x' in the form of pq, where p, q are co prime and prime factorisation of 'q' is of the form 2^n5^m where 'n' and 'm' are non negative integers.
- Let x = pq be a rational number, such that the prime factorization of 'q' is the form of 2^n 5^m where n and m are non integers. Then 'x' has a decimal expansion which terminates.
- Let x = pq be a rational number, such that the prime factorization of 'q' is not of the form 2^n5^m where n and 'm' are non negative integers. Then 'x' has a decimal expansion which is non terminating repeating (recurring).

Exercise 1.1

1. Use Euclid's division algorithm to find the HCF of

i) 135 and 225

Answer: We apply division algorithm

225 = (135 x 1) + 90 (225 >135)

135 = (90 x 1) +45

90 = (45 x 2) + 0

Reminder is 0, the divisior in the last step is 45

∴ Therefore HCF (135, 225) is 45.

ii) 196 and 38220

Answer: We apply division algorithm

38220 = (196 x 195) +0

∴ Therefore HCF is 196

iii) 867 and 255

Answer: We apply division algorithm

867 = (255 x 3) + 102 (867 >255)

255 = (102 x 2) +51

102 = (51 x 2) +0

∴ Therefore HCF is 51

2. Show that any positive odd integer is of the form 6q+1, or 6q +3, or 6q +5, where q is some integer.

Answer: Let 'a' be any positive integer and b = 6

Then by Euclid's algorithm

a = 6q+r for some integer q ⩾ 0 and

r = 0, 1, 2, 3, 4, 5

Therefore

a = 6q, 6q+1, 6q=2, 6q+3, 6q+4, 6q+5, also

6q+1 = 2x(3q)+1 = 2 k_1+1, where k_1 is an integer

6q+ 3 = 2x(3q+1) + 1 =2 k_2+1, where k_2 is an integer

6q+ 5 = 2(3q+2)+1 = 2k_3+1, where k_3 is an integer.

Therefore clearly 6q+1, 6q+2 and 6q+5 are of the form 2k+1, where k is an integer.

Hence these expressions of numbers are odd numbers and therefore any odd integer can be expressed in the form of 6q+1, 6q+3 or 6q+5.

3. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

Answer:

Total number of members = 616

Number of members in the army band = 32

Maximum number of columns in which they can march = HCF (616, 32)

By using Euclid's division algorithm

since 616 > 32,

616 = (32x19) +8

32 = (8 x 4) +0

The HCF (616, 32)= 8.

Hence, the maximum number of columns in which they can march = 8

4. Use Euclid's division lemma to show that the square of any positive integer is either of the form 3m or 3m+1 for some integer m.

Answer: Let 'a' be positive integer and b =3,

using division algorithm lemma

a = 3q+r for some integer q > 0 where r = 0,1,2

Therefore

$a = 3q$ or $3q+1$ or $3q+2$

$a^2 = (3q)^2 = 9q^2 = 3(3q^2)$

$= 3m_1$ where m is an integer

$(3q+1)^2 = 9q^2 + 6q+1$

$= 3(3q^2+ 2q)+1$

$= 3m_2 +1$ where m_2 is an integer

$(3q+2)^2 = 9q^2 + 12q +4$

$= 9q^2 + 12q=3+1$

$= 3(3q^2 +4q+1) +1$

$= 3m_3 +1$ where m_3 is an integer

∴ clearly it can be said that square of any positive integer is either of form 3m or 3m+1

5. Use Euclid's division lemma to show that the cube of any positive integer is of the form 9m, 9m+1 or 9m+8.

Answer : Let 'a' be any positive integer and b =3

Using division lemma

$a = 3q+r$ where r = 0, 1, 2

∴ $a = 3q, 3q+1, 3q+2$

Case 1 where a = 3q

$a^3 = (3q)^3 = 27q^3 = 9(3q^3) = 9m$, where $m=3q^3$

Case 2 where a = 3q+1

$a^3 = (3q+1)^3 = 27q^3+ 1+ 27q^2+9q$

$= 9 (3q^3+3q^2+q) +1$

$= 9m+1$, where $m = 3q^3 = 3q^2+q$

Case 3 where a = 3q+2

$a^3 = (3q+2)^3$

$= 27q^3+54q^2+36q+8$

$= 9(3q^3 + 6q^2+4q)+8$

$= 9m + 8$ where $m =3q^3+6q^2+4q$

∴ cube of any positive integer is of the form 9m, 9m+1, 9m+8

Exercise 1.2

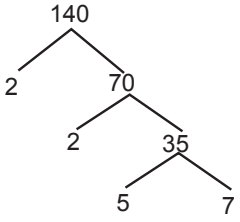
1. Express each number as a product of its prime factors

i) 140, ii) 156, iii) 3825, iv) 5005, v) 7429

Answer:

i) 140

Using factor tree method



ii) $140 = 2 \times 2 \times 5 \times 7 = 2^2 \times 5 \times 7$

156

iii) $156 = 2 \times 2 \times 3 \times 13 = 2^2 \times 3 \times 13$

3825

$3825 = 3 \times 3 \times 5 \times 5 \times 17 = 3^2 \times 5^2 \times 17$

iv) 5005 = 5x7x11x13

v) 7429 = 17x19x23

2. Find the LCM and HCF of the following pairs of integers verify that LCM x HCF = product of the two numbers.

i) 26 and 91 ii) 510 and 92 iii) 336 and 54

Answer:

HCF is the product of common prime factors raised to least power, while LCM is product of prime factors raised to highest power. HCF is always a factor of the LCM.

i) 26 and 91

HCF

26 = 2 x 13

91 = 7 x 13

∴ HCF = 13

LCM

26 = 2 x 13

91 = 7 x 13

∴ LCM= 2 x 7 x 13 =182

Now

Product of two numbers = 26 x 91 = 2366

HCF x LCM = 13 x 182 = 2366

∴ LCM x HCF = Product of numbers

ii) 510 and 92

510 = 2 x 3 x 5 x 17

92 = 2 x 2 x 23

∴ HCF =2

LCM = 2 x 3 x 5 x 2 x 17 x 23 = 23460

Product of two numbers = 510 x 92 = 46920

LCM x HCF = 2 x 23460 = 46920

∴ Hence verified

iii) 336 and 54

336 = 2^4 x 3 x 7

54 = 2 x 3^3

HCF = 2 x 3 = 6

LCM = 24 x 3^3 x 7 = 3024

Product of two numbers = 336x54 =18144

LCM x HCF = 6 x 3024 = 18144

∴ Hence verified

3. Find the LCM and HCF of the following integers by applying the prime factorisation method.

i) 12, 15 and 21 ii) 17, 23 and 29 iii) 8,9 and 25

Answer:

HCF is the product of common prime factors of all three numbers raised to least power, while LCM is product of prime factors of all here raised to highest power. Use the fact that HCF is always a factor of the LCM to verify the answer.

i) 12, 15 and 21

12 = 2 x 2 x 3

15 = 3 x 5

21 = 3 x 7

2 | 12	3 | 15	3 | 21
2 | 6	5 | 5	7 | 7
3 | 3	1	1
1		

HCF = 3

LCM = 2 x 2 x 3 x 5 x 7 = 420

ii) 17, 23 and 29

17 = 1x17

23 = 1x23

29 = 1x29

HCF =1

LCM = 17 x 23 x 29 = 11339

iii) 8,9 and 25

8 = 2 x 2 x 2

9 = 3 x 3

25 = 5 x 5

HCF = 1

LCM = 8 x 9 x 25 = 1800

4. Given that HCF (306, 657) = 9, find LCM (306, 657)

Answer:

This problem must be solved using product of two numbers = HCF x LCM rather then prime factorisation.

HCF (306, 657) =9

We know,

LCM x HCF = Product of two numbers

$$LCM = \frac{\text{Product of two numbers}}{HCF} = \frac{306 \times 657}{9} = 22338$$

5. Check whether 6n can end with the digit 0 for any natural number 'n'.

Answer:

If any number ends with digit 0, it should be divisible by 2, 5 or 10

Prime factorisation of $6^n = (2x3)^n$.

As 5 is not in the prime factorisation of 6^n

Hence for any value of 'n', 6^n will not divisible by 5 or 2 and hence by 10

Therefore, 6^n can't end with digit 0 for any natural number 'n'.

6. Explain why 7 x 11 x 13 + 13 and 7 x 6 x 5 x 4 x 3 x 2 x 1+5 are composite numbers.

Answer:

Numbers are of two types - prime and composite.

Prime numbers can be divided by 1 and the number itself.

Hence,

7 x 11 x 13 + 13 = 13(7 x 11 + 1)

= 13(77+1) = 13 x 78

= 13 x 13 x 6

The given expression has 6 and 13 as its factors.

Therefore it is a composite number.

7 x 6 x 5 x 4 x 3 x 2 x 1 + 5

= 5(7 x 6 x 4 x 3 x 2 x 1 +1)

= 5(1008+1)

= 5 x 1009

The given expression has 5 and 1009 as it factors.

Therefore its is a composite number.

7. There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field. While Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?

Answer:

It can be observed that Ravi takes lesser time than Sonia for completing 1 round of the circular path. As they are going in same direction, they will meet again at the same time when Ravi will have completed 1 round of that circular path with respect to Sonia. LCM of time taken by Sonia and Ravi for completing 1 round i.e.,

LCM of 18 minutes and 12 minutes

18 = 2 x 3 x 3

And 12 = 2 x 2 x 3

LCM of 12 and 18 = 2 x 2 x 3 x 3 = 36

Therefore, Ravi and Sonia will meet together at the starting point after 36 minutes.

Exercise 1.3

1. Prove that $\sqrt{5}$ is irrational.

Answer:

Let $\sqrt{5}$ is a rational number

Therefore we can find two integers a,b (b ≠0) such that

$\sqrt{5} = \frac{a}{b}$ a where a, b are co prime

Now $a = \sqrt{5}b$

$a^2 = 5b^2$

Therefore a^2 is divisible by 5 and hence 'a' is divisible by 5 ---------- 1

Now let a = 5 c where c is an integer

Squaring both sides

$a^2 = 25c^2$

$= 5b^2 = 25c^2$ $(a^2 = 5b^2)$

$= b^2 = 5c^2$

This means that 5 divides b^2 and so

5 divides b ---------- 2

From 1 and 2 it contradicts the fact that 'a' and 'b' are co-prime

Therefore $\sqrt{5}$ is irrational.

2. Prove that $3+2\sqrt{5}$ is irrational.

Answer:

Let $3 +2\sqrt{5}$ is rational

$\therefore$ we can find two co prime integer a, b ($b\neq0$) such that

$3+2\sqrt{5} = \frac{a}{b}$

$= 2\sqrt{5} = \frac{a}{b} = -3$

$=\sqrt{5} = \frac{1}{2} \frac{(a-3)}{b}$

As a and b are integers $\frac{1}{2} \frac{(a-3)}{b}$ will be a rational numbers and hence $\sqrt{5}$ is rational.

It contradicts the fact that $\sqrt{5}$ is irrational. Hence our assumption that $3 + 2\sqrt{5}$ is rational is wrong. Therefore $3+2\sqrt{5}$ is irrational.

3. Prove that the following are irrational:

i) $\frac{1}{\sqrt{2}}$ ii) $7\sqrt{5}$ iii) $6 +\sqrt{2}$

Answer: $\frac{1}{\sqrt{2}}$

Let $\frac{1}{\sqrt{2}}$ is rational. So we can find 'a' and 'b' and co-prime numbers($b\neq0$)

Such that $\frac{1}{\sqrt{2}} = \frac{a}{b}$

$= \sqrt{2} = \frac{b}{a}$

As b is rational … $\sqrt{2}$ is also rational

It contradicts the fact that $\sqrt{2}$ is irrational, Thus $\frac{1}{\sqrt{2}}$ is irrational.

ii) $7\sqrt{5}$

Let $7\sqrt{5}$ is rational. that is, we can find 'a' and 'b' as co-prime numbers ($b\neq0$) such that

$7\sqrt{5} = \frac{b}{a}$

$=\sqrt{5} = \frac{b}{a}$

As $\frac{a}{7b}$ is rational, …$\sqrt{5}$ is rational too.

It contradicts the fact that $\sqrt{5}$ is irrational.

iii) $6+\sqrt{2}$

Let $6 +\sqrt{2}$ is rational

Therefore, we can find two co-prime integers a, b ($b\neq0$) such that

$6+ \sqrt{2} = \frac{b}{a}$

$=\sqrt{2} = \frac{b}{a} = -6$

Since a and b are integers, $\frac{b}{a}$ -6 is also rational

And hence $\sqrt{2}$ is also rational. This contradicts the fact that $\sqrt{2}$ is irrational. Therefore our assumption is wrong. Thus $6+\sqrt{2}$ is irrational.

EXERCISE 1.4

1. Without actually performing the long division, state whether the following rational numbers will have a terminating decimal expansion or a non terminating repeating decimal expansion:

i) $\frac{13}{3125}$ ii) $\frac{17}{8}$ iii) $\frac{64}{455}$ iv) $\frac{15}{1600}$ v) $\frac{29}{343}$

vi) $\frac{23}{2^3 5^2}$ vii) $\frac{129}{2^2 5^7 7^5}$ viii) $\frac{6}{15}$ ix) $\frac{35}{50}$ x) $\frac{77}{210}$

Answer:

i) $\frac{13}{3125} = \frac{13}{5^3}$

As denominator is of the form 5^m

Therefore $\frac{13}{3125}$ is terminating

ii) $\frac{17}{8} = \frac{17}{2^3}$

As denominator is of the form 2^m … $\frac{17}{8}$ is terminating.

iii) $\frac{64}{455} = \frac{64}{4 \text{ x } 7\text{x } 13}$

Since denominator is not in the form of 2^m or 5^m or $2^n 5^m$

Therefore $\frac{64}{455}$ is non terminating repeating.

iv) $\frac{15}{1600} = \frac{15}{2^6 \text{ x } 5^2}$

As denominator is of form $2^m 5^n$

Therefore $\frac{15}{1600}$ is terminating

v) $\frac{29}{343} = \frac{29}{7^3}$

As denominator is not in the form $2^m 5^n$

Therefore $\frac{29}{343}$ is non terminating

vi) $\frac{23}{2^3 5^2}$

As denominator is of the form $2^n 5^m$

Therefore $\frac{23}{2^3 5^2}$ is terminating

vii) $\frac{129}{2^2 5^7 7^5}$

Since denominator is not of the form 2^n5^m and has 7 as its factor.

Therefore $\frac{129}{2^2 5^7 7^5}$ is non terminating repeating.

viii) $\frac{6}{15} = \frac{2 \times 3}{5 \times 3} = \frac{2}{5}$

The denominator is of from 5^n

Hence the decimal expansion $\frac{6}{15}$ is terminating

ix) $\frac{35}{50} = \frac{5 \times 7}{5 \times 5 \times 2} = \frac{7}{5 \times 2}$

The denominator is of the form $5^m 2^n$

Hence the decimal expansion of $\frac{35}{50}$ is terminating.

x) $\frac{77}{210} = \frac{7 \times 11}{7 \times 2 \times 3 \times 5} = \frac{11}{2 \times 3 \times 5}$

The denominator is not of the form $2^n 5^m$

Hence $\frac{77}{210}$ is terminating

2. Write down the decimal expansions of those rational numbers in Question 1 above which have terminating decimal expansions.

Answer:

i) $\frac{13}{3125} = \frac{13 \times 2^5}{5^5 \times 2^5} = \frac{13 \times 32}{10^5} = 0.00416$

ii) $\frac{17}{8} = \frac{17 \times 5^3}{2^3 \times 5^3} = \frac{17 \times 125}{10^3} = 2.125$

iii) $\frac{64}{455}$ = Decimal expansion is non terminating repeating.

iv) $\frac{15}{1600} = \frac{15}{2^6 \times 5^2} = \frac{15 \times 5^4}{2^6 \times 5^6} = \frac{15 \times 625}{10^6}$

$= \frac{9375}{10^6} = 0.009375$

v) $\frac{29}{343}$ = Decimal expansion is non terminating repeating

vi) $\frac{23}{2^3 5^2} = \frac{23 \times 5}{2^3 \times 5^2} = \frac{115}{10^3} = 0.115$

vii) $\frac{129}{2^2 5^7 7^5}$ = Decimal expansion is non terminating repeating.

viii) $\frac{6}{15} = \frac{2 \times 3}{3 \times 5} \times \frac{2}{2} = \frac{4}{10} = 0.4$

ix) $\frac{35}{50} = \frac{5 \times 7}{5 \times 5 \times 2} = \frac{7}{10} = 0.7$

x) $\frac{77}{210}$ = Decimal expansion is non terminating repeating

3. The following real numbers have decimal expansions as given below. In each case decide whether they are rational or not. If they are rational, and of the form p what can you say about the prime factors of q?

i) 43.123456789 ii) 0.120120012000120000

iii) 43.123456789

Answer:

i) 43.123456789

Since this number has a terminating decimal expansion. It is a rational number of the form p and q of the form $2^m \times 5^n$ Prime factors of q will be either 2 or 5 both.

ii) 0.120120012000120000

The decimal expansion is neither terminating non recurring. Therefore the given number is an irrational number.

iii) 43.123456789

Since the decimal expansion is non terminating recurring, the given number is a rational number of p

Form where q is not of the form $2^m x 5^n$. i.e., prime factors of q has factors other than 2 or 5.

Extra Questions

1. HCF of 2 numbers is 97their LCM is 1455. If one of the numbers is 485 find the other.

Answer:

We know,

HCF x LCM = Product of two numbers

97 x 1455 = 485 x X

$=X = \frac{97 \times 1455}{485}$

$=X = 291$

Therefore the other number is 291.

2. Prove that product of 2 consecutive numbers (positive integers) is divisible by 2.

Answer:

Let two consecutive numbers be X and X+1

Let X = 2q + r , o < r < 2

Therefore X = 2q , 2q + 1

Product of X (X+1) = (2q) (2q+1)

if X = 2q then it is divisible by 2

if X = 2q + 1

= (2q + 1) (2q+2)

= 2(2q+1) (q+1) which is divisible by 2

Product of any 2 consecutive integers is divisible by 2

Note : Product of 'n' consecutive positive integers is divisible by n! [n! = nx(n-1)(n-2) x ……..(1)
For example : 3!= 3 x 2 x 1 = 6

3. Prove that if a and b are even positive integers their $a^2 + b^2$ is even and is divisible by 2

Answer:

Let a = 2p b=2q

$a^2 + b^2 = (2p)^2 + (2q)^2 = 4p^2 + 4q^2$

$= 4(p^2+q^2)$

$= 2x2\ (p2+q2)$

$= 2$ m where m

$= 2(p^2+q^2)$

Therefore $a^2 + b^2$ is even and is divisible by 2.

4. Show that $\sqrt{6}$ is not a rational number.

Answer:

Let $\sqrt{6}$ be a rational number.

i.e., $\sqrt{6} = p$ where p and q are co-prime and b≠0

as $1^3 = 1$ and $2^3 = 8$

Therefore $1 < \frac{p}{q} < 2$

$\frac{p}{q}$ is an integer

Therefore no integer lies between 1 and 2

Now $6 = \frac{(p)3}{q}$

$= 6 = \frac{p^3}{q}$

$= 6q^2 = \frac{p^3}{q}$

As q is an integer $6q^2$ is also an integer and since q > 1. Thus it does not have common factor with p and consequently with p^3

So $\frac{p^3}{q}$ is a fraction different from an integer

Thus $6q^2 \neq \frac{p^3}{q}$

This contradicts the fact and hence $3\sqrt{6}$ is irrational.

5. What is the HCF and LCM of

$A = X^3 Y^5$

$B = X^2 Y^3$

Answer:

A = X x X x X x Y x Y x Y x Y x Y

B = X x X x Y x Y x Y

HCF = $X^2 Y^3$

LCM = $X^3 Y^5$

6. Find the least number that is divisible by all number between 2 to 8 (both exclusive)

Answer:

We have to find the LCM

Therefore LCM (3,4,5,6,7)

Therefore The least number that is divisible by these numbers is 420.

MULTIPLE CHOICE QUESTIONS

1. Decimal expansion of $\frac{7}{80}$ will terminate after

a. one decimal place
b. two decimal place
c. three decimal place
d. four decimal place

Answer : c. three decimal place

2. Every even integer is of the form

a. p b. 2p c. 2p + 1 d. p+ 3

Answer : b. 2p

3. If p and q are two integers such that p=a5b7 and q=a3b5 where a and b are prime then LCM (p, q) =?

a. $a^3 b^5$ b. $a^8 b^{12}$ c. $a^5 b^7$ d. ab

Answer : $a^5 b^7$

4. When rational number is multiplied with irrational number, the result is

a. always irrational b. always rational
c. either a or b d. none of these

Answer : a. always irrational

5. If the HCF of 57 and 133 is expressible in the form 133 -57 p then value of p is

a. 4 b. 3 c. 2 d. 1

Answer : c. 2

6. $\frac{173}{625}$

a. terminating decimal expansion
b. non-terminating decimal expansion
c. non-terminating repating decimal expansion
d. none of these

Answer: a. terminating decimal expansion

7. $a^{2m} - b^{2n}$ is divisible by

a. $a^m + b^n$ b. $a^m - b^n$
c. both a and c d. none of these

Answer : c. both a and c

8. What is the condition of 'q' and 'r' in Euclid's Division Algorithem?

a. q is not unique and r > b, r also unique
b. q is unique and o < r < b, r not unique
c. q is unique and o ⩽ r < b, r not unique
d. q is unique and o ⩽ r ⩽ b, r unique

Answer : d. q is unique and o ⩽ r ⩽ b, r unique

9. Any rational number can be of the form

a. $\frac{p}{q}$, q ≠ 0 b. $\frac{p}{q}$, q = 0

c. either a or b d. none of these

Answer : a. $\frac{p}{q}$, q ≠ 0

10. HCF of 29 x 16 and 29 x 17 is

a. 16 b. 17 c. 29 d. 29 x 17

Answer : c. 29

11. What is the greatest possible time taken by Ram when he walk 22 km and 77 km at equal speeds?

a. 22 km/hr b. 77 km/hr
c. 14 km/hr d. 11 km/hr

Answer : d. 11 km/hr

12. The number between 4000 and 5000 divisible by each of 12, 18, 21 and 32 is

a. 4302 b. 4032
c. 4023 d. 4203
Answer : b. 4032

TRUE OR FALSE

1. Does every point on the number line represent a rational number.
Answer : False

2. Is $\frac{22}{7}$ a rational number?
Answer : True (rational as it recurring)

3. Is p rational number?
Answer : False (It is non terminating, non repeating)

4. 6 + 3 $\sqrt{5}$ is irrational
Answer : True (as $\sqrt{5}$ is irrational

5. The prime factorisation of a natural number is unique, except for the order of its factors.
Answer : True

6. HCF (a, b) where a and b are prime is ab.
Answer : False

7. Irrational number can't be written as $\frac{p}{q}$ form q ≠ o
Answer : True

8. The product and quotient of a non zero rational and irrational number is irrational.
Answer : True

9 . $\frac{23}{400}$ will terminate after 2 decimal places

Answer : False

FILL IN THE BLANKS

1. ..... is a technique used to calculate HCF of two given positive integers.
Answer : Euclid's Division Algorithem

2. Every composite number can be expressed as .....
Answer : Product of prime

3. HCF (16, 20) = ... of each common prime factor in the number.
Answer : Product of smallest number

4. LCM (46, 120) = ... of each prime factor involved in the number.
Answer : Product of greatest number

5. HCF x ..... = Product of numbers.
Answer : LCM

6. The product of rational and irrational number is always .....
Answer : Irrational

7. Any rational number of the form $\frac{p}{q}$ where q is of the form 2n 5m has?
Answer : Decimal expansion

8. Every irrational number is of the form.....
Answer : Non terminating and non repeating decimal

EXTRA QUESTION

1. **Assertion : If HCF = 9 and the numbers are 18 and 27, then LCM = 54**

Reason : HCF x LCF = Product of the numbers

a. Both assertion and reason are true and reason is the correct explanation of assertion.
b. Both assertion and reason are true and reason is not the correct explanation of assertion.
c. Assertion is true and reason is false.
d. Assertion is false and reason is true.

Answer : Option (a) is correct
HCF x LCM = Product of the numbers.
9 x 54 = 18 x 27

Q 2.
Statement 1 - Euclid's Division Lemma states that given any positive integers 'a' and 'b' there exist unique 'q' and 'r'.
Statement 2 - a = bq + r , 0 ⩽ r < b

a. Statement 1 is true and statement 2 is false
b. Statement 1 is false and statement 2 is true
c. Statement 1 and 2 are true
d. Both statement 1 and 2 are false.
Answer : c. Statement 1 and 2 are true

Q 3.
Statement 1 - Every composite number can be expressed as product of primes. This factorisation is unique apart from the order in which prime factors occur.

Statement 2 - This is known as fundamental theorem of arithematic.

a. Statement 1 is true, statement 2 is false.
b. Statement 1 is false, statement 2 is true.
c. Both statement 1 and statement 2 are true.
d. Both statement 1 and statment 2 are false.
Answer : c. Both statement 1 and statement 2 are true.

Q4.
Statement 1 - Let x = p/q be rational number where q is of the form $2^n 5^m$ where n and m are integers (non-negative).
Statement 2 - x has decimal expansion which is non terminating (non-recurring)

a. Statement 1 is true, statement 2 is false.
b. Statement 1 is false, statement 2 is true.
c. Both statement 1 and statement 2 are true.
d. Both statement 1 and statement 2 are false.
Answer : a. Statement 1 is true, statement 2 is false.

PRACTICE

CHAPTER 1

THE RISE OF NATIONALISM IN EUROPE

New Words

- Nationalism (patriotism) : A feelings of love or pride for your own-nation state (country)
- Nation –state: Is the one in which citizen share a sense of common identity. Commonly in history, culture, language, tradition etc...
- Absolutist: A monarchical form of Government that enjoys absolute power.
- Utopian: A society that is so ideal that is unlikely to actually survive.
- Plebiscite: A direct vote by which the people of a region to accept or reject a proposal.
- Suffrage: the right to vote.

Frederic sorrieu (French artist) and his visualization:

In 1843 Frederic Sorrieu, a French artist, prepared a series of four prints, visualizing his dream of a world made up of democratic and social republic.

- The first print shows the people of Europe and America marching in a long train, and offering homage to the statue of liberty as they pass by it. A female figure carries a touch of enlightenment in one hand and the charter of the rights of man, in the other human.
- On the earth lie the shattered remains of the symbols of absolutist institutions.
- In Sorrieu utopian vision, the people of the world are grouped as distinct nation, identified through their flags and national costumes.
- Leading the procession are USA and Switzerland, followed by France and Germany following Germany are Austria, kingdom of the two sicilies, Lombardy, Poland, England, Ireland, Hungary and Russia.
- The emergence of a Nation- state

  -It replaced the dynastic empires of Europe.

  -The majority of citizens and rulers developed a sense of common identity and shared a history or descent.

  - This was achieved by struggles by the leaders and common people.

The French Revolution and the Idea of the Nation:

French Revolution of 1789 was the first clear expression of nationalism.

- Steps taken by French Revolutions to create a sense of collective identity amongst the French people
- Ideas of La patrie (the fatherland) and Le Citoyen (the citizen)
- New French flag
- Estates general were elected and renamed national Assembly.
- New hymns composed and oaths taken
- Centralized administration system.
- Internal customs duties and dues were abolished
- Uniform system of weights and measures were adopted.
- French became the common languages of the nation.

French became the common language.

The French revolution began on 14th July 1789 by breaking then braking the Bastille Prison as this stood for despotic power of king.

The Causes of French Revolution

The here main causes are 1. Political Cause, 2. Social Cause, 3. Economic Cause.

1. Political Cause

- During the eighteenth century, the French monarchs enjoyed unlimited powers and declared themselves as the representatives of God.
- The French monarch Louis XIV lived a luxurious life and enjoyed unlimited powers. By the “Letter de Catched” they could arrest any person any time and could imprision them. No attention was paid towards their people.
- During Louis XVI period, the economic conditions of France got weakened due to the ‘seven years war’ he fought against England.
- Louis XVI was interfered by his **Queen Marie Antoinette** in all the affairs of the state. Although the economic conditions was very weak and people led a miserable life, she enjoyed a luxurious life. She sowed the seed of the French Revolution.

Conclusion : The autocratic monarchy, defective administration, Luxurious expenditure formed the political cause of the French Revolution.

2. Social Cause

The Social condition of France was very miserable during the 18th century. The French society was divided into three classes – the clergy, nobles and common people.

A. THE CLERGY : They belonged to the first estate . They

were subdivided into two

i) Higher clergy

a) Occupied top position in the society.
b) managed churches, monasteries and educational institutions of France.
c) They paid no taxes to Monarch
d) They lived a life of luxury exploiting the common people.

ii) Lower clergy

a) Served the people
b) Lived a miserable life

B. THE NOBILITY – They were regarded as the second Estate in the French Society. They were divided into two.

i) Court nobles

a) Lived in pomp and luxury not paid any taxes did not pay any attention towards the common people.
b) did not pay any attention towards the common people

ii) Provincial nobles

a) They did not enjoy all the privileges as the court nobles enjoyed.
b) They paid their attention towards the problems of the people.

C. Common people – They belonged to the Third Estate.

- It firmed a heterogeneous class.
- The farmers, cobblers, sweepers and other lower classes belonged to this class.
- The condition of these groups were very miserable.

The Bourgeoisie formed the top most group of the third estate included the doctors, writers, lawyers, teachers, business men and philosopher. Although they had the wealth and social status they were also ranked as the Third Estate by the Monarch. They influenced the common people of revolution and told them about their rights.

- The lower clergies and the provincial nobles also joined with the common people along with the Bourgeoisie. So the French revolution is also known as Bourgeoisie Revolution.

3. Economic Cause

Economic condition of France became very miserable under Louis XIV due to wars. Royal treasury became empty. The condition still became worse under Louis XVI due to the unnecessary expenses by queen Marie Antoinette. The economic instability formed one of the most important causes of French Revolution.

The French Revolution gave birth to the ideas of :

- **Liberty**
- **Fraternity**
- **Equality**

French Philosophers

1. **John Lock :** Inspired people against the doctrine to divine and absolute right of the monarch.
2. **Rousseau :** Proposed to form a government based on social equality.
3. **Montesquieu :** Proposed a division of power with in the government between the legislative executive and the judiciary.

Napoleon

- Ruled France from 1799 to 1815
- Gained absolute power in 1799 by becoming the first consul.
- Civil code of 1804/ Napoleonic Code (Did away all the privileges based on birth, brought equality before law and gave the right to property.)
- Simplified administrative measures
- Abolished feudal system
- Freed peasants from serfdom and manorial dues
- Guild restrictions were removed
- Transport and communication systems were improved.

Napoleon took away political freedom, increased taxes imposed censorship and forced people to join French army.

Activity

What is your opinion about Napoleonic code in the French revolutions?

The making of nationalism in Europe:

Germany, Italy and Switzerland were divided into kingdoms, duchies and cantons whose rulers had their autonomous territories. They did not see themselves as sharing a collective identity or a common culture. The Habsbury Empire ruled over Austria Hungary. In Hungary half of the population spoke Magyar while the other half spoke a variety of dilates. Besides these three dominant groups, there also lived within the boundaries of the empire. The only tie binding these diverse groups together was a common allegiance to the emperor.**The aristocracy and the new middle class:**

1. Socially and politically, a landed aristocracy was the dominant class on the continent.
2. The members of this class were united by a common way of life that cut across regional divisions.
3. Their families were often connected by ties of marriages.
4. This powerful aristocracy was, however, numerically a small group. The growth of towns and the emergence of commercial classes whose existence was based on production for the market.
5. Industrialization began in England in the second half of

the eighteenth century, but in France and parts of the German states it occurred only during the nineteenth century.

6. In its wake, new social groups came into being a working class population and middle classes made up of industrialists, businessmen professional.
7. It was among the educated, liberal middle classes that ideas of a national unity following the abolition of aristocratic privileges gained popularity.

II) What did liberal nationalism stand for?

- Liberalism stood for freedom for the individual and equality for all before the law.
- The end of autocracy and clerical privileges.
- A constitution and representative government through parliament.
- In the economic sphere liberalism stood for the freedom of markets and the abolition of state imposed restriction on the movement of goods and capital.
- Zollverein abolished tariff barriers reduced the number of currencies to two, and promoted a network of railways to stimulate mobility.
- **III) A new conservation after 1815**
- Believed that established traditional institutions of state and society should be preserved, with the changes initiated by Napoleon.
- Treaty of Vienna (1815)
- Bourbon dynasty was restored to power in France
- A series of states created on the French boundary for preventing French expansion in future.
- German confederation was left untouched.
- Main intention was to restore the monarchs that have been over thrown by Napoleon.

IV) The Revolutionaries:

A commitment to oppose monarchical forms that had been established after the Vienna congress and to fight for liberty Giuseppe Mazzini

- Born in Genoa in 1807
- A member of the secret society of Carbonary
- Founded young Italy in Marseilles, young Europe in Berne
- Believed in the unification of Italy into a republic.

The age of revolutions: 1830-1848

As conservative regimes tried to consolidate their power liberalism and nationalism came to be increasingly associated with revolution in many regions of Europe such as the Italian and German states. The provinces of the Ottoman Empire, Ireland and Poland. 'When the France sneezes', Metternich once remarked, 'the rest of the Europe catches cold'. An event that mobilized nationalist feelings among the educated elite across Europe was the Greek war of independence. And Greece had been the part of the Ottoman Empire. Since the fifteenth century, Greeks living in exile and also from many west Europeans who had sympathies for ancient Greek culture.

I) The Romantic imagination and national feelings:

- The development of nationalism did not come about only through wars and territorial expansions.
- Culture played an important role in creating the idea of the nation art and poetry, stories and music helped express and shape nationalist feeling.
- Let us look at romanticism, a culture movement which sought to develop a particular form of nationalist sentiments.
- Romantic artists and poet generally criticised the glorification of reason and science and focused instead on emotions, institution and mystical feelings.
- Other romantics were through folk song, folk poetry and folk dances that the true spirit of the nation.
- National feelings were kept alive through music and languages.
- Karol Kurpinski celebrated the national struggles through his operas and music, turning folk dances like the polonaise and mazurka into nationalist symbols.
- Languages too played an important role in developing nationalist sentiments.
- Russian language was imposed everywhere.
- Many members of the clergy in Poland began to use languages as a weapon of national resistance.
- As a result, a large number of priests and bishops were put in jail or sent to Siberia by the Russian authorities as punishment for their refusal to preach in Russians.

ii) Hunger, Hardship and popular revolt:

The 1830s was years of great economic hardship in Europe. The first half of the nineteenth century saw an enormous increase in population. In most countries there were more seekers of jobs than employment. Population from rural areas migrated to the cities to live in overcrowded slum. And also the lack of food and widespread unemployment

brought the population of Paris out on the roads. National assembly proclaimed a republic, granted suffrage to all adult males above 21, and guaranteed the right to work.

iii) 1848: The revolution of the liberals:

- The poor, unemployed and starving peasants and workers in many European countries in the years 1848, a revolution led by the educated middle classes was under way.
- Man and women of the liberal middle classes combined their demands for constitutionalism and national unification.
- They drafted a constitution for a German nation to be headed by a monarchy subject to a parliament.
- Wilhelm IV King of Prussia rejected it and joined other monarchs to oppose the elected assembly.
- While the opposition of the aristocracy and military become stronger, the social basics of parliament eroded.
- The issues of extending political rights to women were a controversial one with the liberal movement.
- The woman had formed their own political association, founded newspaper and taken part in political meetings and demonstration.
- Women were only admitted as observers to stand in the visitors' gallery.
- Monarchs were beginning to realize that the cycles of revolution and repression could be ended by granting concessions to the liberal nationalist revolutionaries.

4. The making of German and Italy

I) Germany

* Otto Van Bismarck with the help of Prussian army and bureaucracy tool on the leadership of the movement for national unification.

* Three war over seven years ended in Prussian victory and completed the process of unification.

* Kaiser William I of Prussia headed the new German Empire

ii) Italy

- Italy was divided into seven states of which only Sardinia piedmont was ruled by an Italian princely state.
- Initially a unification programme was initiated by Giuseppe Mazzini, but it failed.
- Chief minister Cavour led the movement with the help of Giuseppe Guribaldi.
- In 1861, Victor Emmanuel II was proclaimed king of united Italy.

iii) The strange case of Britain:

- In 1688, England established as a nation state.
- English parliament seized power from the monarchy.
- The Act of union 1707 resulted in the formation of the 'United kingdom of great Britain'.
- 1801, Ireland was forcibly taken by the British after the failed revolution.
- A new 'British Nation' was founded through the propagation of a dominate English Culture.

5) Visualising the nation

* Nations were portrayed as female figure (Allegory)

* The female form that was chosen to personify the nation did not stand for any particular woman in real life; rather it sought to give the abstract idea of the nation a concrete form.

* In France the allegory was christened as mariner, in Germany Germania became the allegory.

6) Nationalism and imperialism

* The Balkans comprised modern day Romania, Bulgaria, Albania, Greece, Macedonia, Croatia, Bosnia – Hergegovina, Solvenia, Serbia and Montenegro.

* Balkans was a region of geographical and ethnic variation was under the control of the Ottoman Empire.

* The idea of Romantic nationalism made this region very explosive.

* The Balkan states were fiercely jealous of each other and each hoped to gain more territory at the expense of each other.

* European powers were also looking for the extend their control over the area.

* This led to a series of wars in the region and finally resulted in the First World War.

QUESTION BANK

1. What did the French revolutionaries consider as the mission and the destiny of the French nation?

Answer: The French revolutionaries considered it as the mission and the destiny of the French nation to liberate the people of Europe from despotism. In other words, to help other people of Europe to become nation.

2. What is liberalism?

Answer: The word liberalism, has been derived from the Latin word 'Liber' which means 'free'. So the meaning of liberalism is the representative government through parliament and the end of autocracy and certain privileges of clerics.

3. What was the result of the revolution of France of 1848?

Answer : The two main results of the revolution of France of 1848 was that Louis Philippe was thrown out of power by liberal middle class and a republic based on universal male suffrage was established over there.

4. Who was Frederic Sorrieu?

Answer: Frederic Sorrieu was a French artist who prepared a series of four points in 1848. His four points visualised a dream of that world which is made up of social republic and democratic countries.

5. Who followed the policy of blood and iron for unification of Germany?

Answer: Bismarck

6. Which was an obstacle in the way of the Italian unification?

Answer: Small states and rule of Pope were the major obstacles in the way of Italian Unification.

7. Who became the king of United Italy?

Answer: napoleon becomes the king of the United Italy.

LONG ANSWER TYPE QUESTIONS

1. What is meant by pan- glass movement?

Answer: Some of the East European provinces of the Ottoman Empire were inhabited by the people of glass race. There were Serbia, Bulgaria, Montenegro and Greece. The Russians were also Glass people. The Ottoman Empire was rapidly advancing towards decay and collapse.

The Glass people under the Ottoman Empire organised movements for freedom. The Russian Czars encouraged this movement against the ottoman Turks. This movement was known as the pan glass movement.

2. Describe the Vienna Congress.

Answer :I) in 1815, representatives of the European powers – Britain, Russia, Prussia and Austria – who had collectively defeated. Napoleon, met at Vienna to draw up a settlement for Europe. The congress was hosted by the Austria Chancellor Duke Metternich.

ii) The delegates drew up the Treaty of Vienna of 1815 with the object of landing most of the changes that had come about in Europe during the Napoleonic wars. The Bourbon dynasty, which had been deposed during the French revolution, was restored to power, and France lost the territories it had annexed under Napoleon.

iii) A series of states were set up on the boundaries of France to prevent the French expansion in future. Thus the kingdom of the Netherlands, which included Belgium, was set up in the north and Genoa was added to piedmont in the south.

iv) Prussia was given important and new territories on its western frontiers, while Austria was given control of northern Italy. But the German confederation of 39 states that had been set up by napoleon was left untouched.

v) In the east, Russia was given part of Poland. While Prussia was given a portion of Sancony. The main intention was to restore the monarchies that had been overthrown by napoleon, and create a new conservative order in Europe.

3. How did culture play an important role in creating the idea of the nation in Europe? Explain with four examples.

Answer :I) Culture: Culture played a very important role in creating the idea of the nation in Europe. Music, Art and poetry developed in creating the idea of nationalism poets and romantic artists focussed on emotions and institutions and criticised the glorification of science and reason. Romanticism gave rise to nationalist sentiments.

ii) **Language:** Language also played a great role in developing nationalism. After the Russian occupation, polish language was forced out of schools and Russian languages were imposed. In 1813, an armed rebellion against Russian rule took place which was crushed. After this, many members of Poland and Calando began to use languages as a weapon of national resistance.

iii) **Music and Dance:** True spirit of the nation was popularised through poetry, dances and folk songs.

iv) **Literature:** A number of great writers of this age aroused sentiments of nationalism. Rousseau, Voltaire, Montesquieu, etc. attached the church and instigated the people to ask for reform.

CHAPTER 1

RESOURCES AND DEVELOPMENT

1. INTRODUCTION

Everything available in our environment which can be used to satisfy our needs can be termed as a resource.

Some conditions

- Technologically accessible
- Economically Feasible
- Culturally Acceptable

- Human beings interact with nature through technology and create institutions to accelerate economic development..
- Resources are a function of human activities.

2. TYPES OF RESOURCES

- Classification of Resources
- Origin
- Exhaustibility
- Ownership
- Status of Development

Origin

Biotic Resources Abiotic Resources

1. Biotic Resources are resources derived from the biosphere such as living things and from forest and the materials derived from them. This mainly includes fossil fuels like, Petroleum, Coal, and Gas etc.
2. Abiotic means other than living things non living things Example- Fresh Air, Land, Heavy Metal etc.

Exhaustibility

Renewable Resources NonRenewable Resources

- Renewable resources are those whose quantity is not reduced due to use and which can be repeatedly used without fear of exhaustion are termed as renewable resources. Example – wind, water, forests etc.
- Non Renewable resources are substances whose stock gets reduced and are gradually exhausted with use are termed as Non-renewable resource. They are exhaustible resources. Example: Fossil fuels like coal, petroleum and minerals.

Ownership

Individual Resources Community Resources National Resources International Resources

1. Individual Resources :
Owned privately by individual
e.g.: Plots, house, car, wells etc.

2. Community Resources: Accessible to all the members of the community
e.g.: Public Parks, Picnic Spots, and Playgrounds etc.

3. National Resources: Technically, all the resources available in the country are national resources.
e.g.: Forests, wildlife land divisions and political territories.

4. International Resources: The oceanic resources beyond 200 KM of the exclusive economic zone belong the international.

Status of Development

Potential Developed Stock Reserves

1. Potential: Which have been found in a region but have not been yet utilised.
2. Developed: Which are surveyed and their quality, quantity has been determined for utilisation.
3. Stock: Which have the potential to satisfy human needs but they do not have appropriate technology to access them.
4. Reserves: Can be put into use with the help of technical know- how but their use has not been started.

Development of Resources

Major problems and need for sustainable development.

Accumulation of resources in few hands dividing the society in ‘haves’ and ‘have not’s.

Indiscriminate use of resources leading to global warming, ozone layer depletion and environmental pollution, land degradation.

Resource planning needed for sustainable existence of all forms of life.

Sustainable economic development is the development that should take place without damaging the environment.

The first international earth summit held in Rio de Janeiro in 1992 attended by 100 countries.

Adopted Agenda 21 to achieve global sustainable

development and to combat poverty, diseases from the world.

.....

Need for resource planning

There are regions which are rich in certain resources and deficient in some other resources

Arunachal Pradesh has abundance of water but lacks infrastructural development.

Rajasthan has abundance of solar and wind energy but lack in water resources.

Resources planning in India

A complex processes involving three processes.

Identification and inventory of resources.

Evolving a planning structure.

Matching the resources development plan with national development plans.

Five year plans launched after independence.

Indian resource development depends on technology, quality of human resources and historical experience of people

Conservation of resources

Vital for any development activity

Irrational consumption and overutilization lead to socio-economic and environmental problems.

Land Resources

Importance of land

Perform all economic activities on land

It's a natural resource supporting natural vegetation, wildlife, economic activates, and transport and communication system.

An asset of a finite magnitude.

.....

Relief features

Variety relief features in India

Plains – covering 43% area

Mountains covering 30% area

Plateaus covering 27% area

Possesses rich resources in all these relief features.

.....

Land utilisation

Forests

Land not available for cultivation Barren and waste land

Permanent pastures and grazing land

Land under miscellaneous trees and cultural wastelands.

Follow lands and net sown area.

Land Resources

Land use pattern of India

Determined by both physical and human factors

Land use data available only for 93% area.

.....

Land degradation

Degraded land 130 million hectare, 28% forest degraded, 56% water eroded, certain human activities

Mining sites are abandoned.

Over grazing and over irrigation is responsible for alkalinity.

Mineral processing like cement Industry, industrial effluents.

.....

Conservation of land

Afforestation and proper management of grazing lands

Planting of shelterbelts.

Control on overgrazing.

Thorny bushes to stabilise sand dunes

Control on mining Activities

Proper discharge and disposal of Industrial effluents

Soil as a Resource

Soil is the most important renewable natural resource. It is the medium of plant growth and supports different types of living organisms on the earth.

Classification of soils

1. Alluvial soil :

i. The entire northern plains are made up of alluvial soils.

ii. These have been deposited by these important Himalayan River System

Indus Ganga Brahmaputra

iii. Alluvial soil is also found, in the eastern coastal plains particularly in the deltas of Mahanadi River, Krishna River, Godavari River, kaveri River.

iv. The Alluvial soil consists of various proportions of sand, silt and clay.

v. Alluvial soil are described on the basis of their age.

- Old banger

Has higher concentration of Kanker Nodules

Less fertile than Khadar

- New Khadar

Has less concentration of Kankar Nodules than banger

Is more fertile than banger

vi. Mostly these soils contain adequate proportion of potash, phosphoric acid and lime which are ideal

for the growth of sugarcane, paddy, wheat and other cereal and pulse crops.

Black Soil

1. These soils are black in colour and are also known as 'regur' soil.
2. They are ideal for growing cotton and is also known as black cotton soil.
3. This type of soil is typical of the Deccan trap (Basalt) region, spread over northwest Deccan Plateau and is made up of lava flows.
4. The black soils are made up of extremely fine i.e. clayey material.
5. These soils are strictly when wet and difficult to work on unless tilled immediately after the first shower or during the pre- monsoon period.

Red and yellow soils

1. Red soil develops on crystalline igneous rocks in areas of low rainfall in the eastern and southern parts of the Deccan Plateau.
2. Yellow and red soils are found in parts of Orissa, Chhattisgarh, southern parts of the middle Ganga plain and along the piedmont Zone of the Western Ghats.
3. These soils develop a reddish colour due to diffusion of iron in crystalline and metamorphic rocks.

Laterite Soil

1. The laterite develops in areas with high temperature and heavy rainfall.
2. This soil is suitable for cultivation with adequate doses of manures and fertilizers.
3. These soils are mainly found in Karnataka, Kerala, Tamil Nadu; this soil is very useful for growing Tea and Coffee.

Arid Soils

1. Arid soils range from red to brown in colour.
2. They are generally sandy in texture and saline in nature.
3. In some areas the salt content is very high and common salt is obtained by evaporating the water.
4. The bottom layer of Kankar restricts the infiltrating the water.
5. After proper irrigation these soils become cultivable as has been in the case of western Rajasthan.

Soil Erosion

1. Denudation of soil cover and subsequent washing down is called soil erosion.
2. Due to human activities like deforestation, overgrazing, construction and mining.
3. Natural forces like wind, water, glacier and water lead to soil erosion.
4. Running water cuts through clayey soil and form gullies.
5. Also caused due to defective method of farming ploughing in a wrong maumer.

Soil Conservation

1. Ploughing along contour lines – Contour ploughing.
2. Steps can be cut on slopes – Terrace Farming
3. Strops of grass are left to grown between crops called – strip cropping.

Project/ Activity

1. Make a project showing consumption and conservation of resources in your locality.
2. Have a discussion in the class – how to conserve various resources used in your school.
3. Imagine if oil supplies get exhausted how this will affect your life style.

Multiple Choice Questions

1. Everything available in our environment to satisfy our needs is termed as
   a. Technology
   b. Resource
   c. Natural vegetation
   d. None of these.
2. Resource planning is essential for …… existence of all forms of life.
   a. Ecological balance
   b. Sustainable
   c. Exploitation
   d. None of these
3. Where was the first international Earth summit held?
   a. Rio-de-janerio
   b. Geneva
   c. Switzerland
   d. Philippines
4. Which one of the following type of resource is iron ore?
   a. Renewable
   b. Biotic
   c. Flow
   d. Non renewable
5. In which one of the following states is terrace cultivation practised?
   a. Punjab
   b. Plains of Uttar Pradesh
   c. Haryana
   d. Uttarakhand

Very Short Answer Type Questions

1. What is a resources? Give two example.

Answer : Everything available in our environment which can be used to satisfy our needs, provided it is technologically accessible, economically feasible and culturally acceptable can be termed as resource. Coal, water, air, minerals etc. are some example of resource.

2. How can the resources be classified on the basis of origin?

Answer : Biotic and Abiotic

3. How can the resources be divided on the basis of exhaustibility?

Answer : Renewable and non renewable

4. Name any two states of India which are well endowed with solar energy

Answer : Gujarat and Rajasthan

5. What is total geographical area of India?

Answer : 328 million sq.km.

6. What is wasteland?

Answer : An unused area of land like rocky, arid and desert areas.

7. What is gross sown area?

Answer : This represents the total sown area once or more than once in a particular year that is the area is counted as many as times as three all sowings in a year.

8. What are biotic resources?

Answer : These are obtained from biosphere and have life such as human beings flora and fauna, fisheries, livestock etc

9. Name any two states where over irrigation is responsible for land degradation.

Answer : i) Punjab ii) Haryana

10. Name any two crops associated with laterite soil

Answer : Tea and Coffee

11. What is wind erosion?

Answer : Wind blows loose soil off flat or sloping land. This is known as wind erosion

12. What is bad land?

Answer : It is a land which is unsuitable for cultivation. Mainly soil erosion converts a fertile land land into a bad land.

13. What is gully erosion?

Answer : Gully erosion takes place when running water cuts deep reulines in the absence of vegetation. This type of erosion makes soil unfit for cultivation.

14. Which soils is the most widely spread in India?

Answer : Alluvial soil.

Short Answer type questions

1. What is stock? Give two examples.

Answer : These are material in the environment which have the potential to satisfy the human needs but could not be used as the human beings do not have the appropriate technology to convert them into usable form for example water (H_2O) is a compound of two inflammable gases that is hydrogen and oxygen but human beings do not have the required technology to use them as a source of energy.

2. Explain the role of humans in resources development.

Answer :

i) Resources are function of human activities

ii) Human beings interact with nature through technology, and create institutions to accelerate their economic development.

iii) Human beings transfer materials available in our environment into resources and use them.

3. What are reserves?

Answer : Reserves are the subset of the stock, which can be put into use with the help of existing technical 'know how' but their use has not been started. These can be used for meeting future requirements. River water can be used for generating hydroelectric power but presently, it is being utilised only to a limited extent. Thus, the water in the dams, forests etc. is a reserve which can be used in the future.

4. What are international resources?

Answer : Resources which are found in a region, but have not been utilised due to lack of capital or other reasons for example, the western parts of India particularly Rajasthan and Gujarat have potential for the development of wind and solar energy, but so far these have not been developed properly.

5. "India is rich in certain types of resources but deficient in some other resources" Support your answer with example.

Answer :

i) The states of Jharkand, Chhattisgarh and Madhya Pradesh are rich in mineral resources but lack industrialisation.

ii) Arunachal Pradesh has in abundance of water resources, but lacks in infrastructural development. The state of Rajasthan is very well endowed with solar and wind energy, but lacks in water resources. The cold desert area of Ladakh is relatively isolated from the rest of the country due to lack of means of transportation and communication.

iii) Most of North- Eastern states are rich in natural vegetation but lacks in fertile soil.

6. Explain the major factors which are responsible for the formation of soil.

Answer :

i) Relief, parent rock or bedrock, climate, vegetation and other forms of life and time are important factors in the formation of soil.

ii) Various forces of nature such as change in temperature, actions of running water, wind and glaciers, activities of decomposes etc. Contribute to the formation of soil.

iii) Chemical and organic changes which take place in the soil are equally important.

iv) Soil also consists of organic (humus) and inorganic materials.

7. Mention the criteria on the basis of which Indian soils can be classified.

Answer : i) Factors responsible for soil formation

ii) Colour iii) Thickness iv) Texture
v) Age vi) Chemical and physical properties.

8. Mention the factors on which the land use pattern of India depends upon.

Answer : The use of land is determined by physical as well as human factors.

i) **Physical factors :** Topography, climate and soil types

ii) **Human factors :** Population density, technological capability, culture and traditions.

Long Answer type Questions

1. What is resource planning? Mention the steps which are involved in resource planning.

Answer : "Resource planning is a technique on skill of proper or judicious use of resource"

Resource planning is a complex process which involves:

i) Identification and inventory of resources across the regions of the country. This involves surveying, mapping, qualitative and quantitative estimates and measurement of the resources.

ii) Evolving a planning structure endowed with appropriate technology skill and institutional set up for implementing resources development plans.

iii) Matching the resources development plans with overall national development plans.

2. Explain the classification of resources on the basis of exhaustibility.

Answer :

i) Renewable resources: "Renewable resources are the natural resources which can be used again and again or can be reproduced by physical, mechanical and chemical processes" Solar energy, air, water and soil are some of the renewable resources of energy.

ii) Non - renewable resources: "Non-renewable resources are the natural resources that cannot be replaced at all or within a reasonable time". Fossil fuels such as oil, gas and coal are examples of non-renewable resources. These resources are accountable over millions of years. They are considered to be non-renewable resources because once they are used up, they are gone forever.

3. Explain the classification of resources on the basis of ownership.

Answer :

a) Individual Resources : Resources which are owned by private individuals are known as individual resources, plots, fields, houses can book etc. are some examples of individual resources.

b) Community owned resources : The resources which are accessible to all the members of the community are known as community resources, village ponds, public park, playground, etc. are some examples of community resources.

c) National resources : All the resources which are under the control of state or union government are known as national resources. All the resources within political boundaries are national resources became the government has the power to acquire even the private properties.

d) International Resources : These resources are owned and regulated by international institutions. The oceanic resources beyond 200 km of the exclusive economic zone belong to the open ocean, and no individual country can utilize these without the convergence of international institution. India has got the right to money manganese nodules from the bed of the Indian Ocean from that area which lies beyond the exclusive economic zone.

4. Suggest any three measures of soil conservation

Answer : Proper farming techniques used for soil cultivation are:

i) Crop rotation : If the same crop is sown in the same field, year after year, this consumes certain nutrients from the soil making it infertile crop rotation can check this type of erosion.

Ii) Settled agriculture: Checking and reducing shifting agriculture by persuading the tribal people to switch over to settled agriculture.

iii) Terracing and contour bunding : Terracing and contour bunding across the hill slopes is a very effective, and one of the oldest methods of soil conservation. Hill slope is cut into a number of terraces having horizontal top and steep slopes on the back and front contour bunding involves the construction of bank along the contour.

iv) Strip cropping : Large fields can be divided into strips. Strips of grass are left to grow between the crops. This breaks, cop the force of the wind. This method is known as strip cropping.

v) Shelter Belt: Planting lines of trees to create shelter also works in a similar way Kow of such trees are called shelter belts. These shelter belts have contributed significantly to the stabilisation of sand dunes and in establishing the desert in western India.

CHAPTER 4

AGRICULTURE

1. INTRODUCTION

India is an agriculturally important country two – thirds of its population is engaged in agricultural activities. Agriculture is a primary activity, which produces most of the food that we consume. Besides food grains, it also produces raw materials for various Industries.

Types of farming

- Primitive subsistence farming
- Intensive subsistence farming
- Commercial farming

1. 1. Primitive subsistence farming:These types of farming are practised on small patches of land with the help of primitive tools like how, Dao and digging sticks. It is a 'slash and burn' agriculture.
2. Intensive subsistencefarming: This type of farming is practised in areas of high population pressure on land. It is a labour intensive farming where high doses of biochemical inputs and irrigation are used for obtaining higher production
3. Commercial farming: the main characteristics of the type of farming are used of higher doses of modern inputs e.g.: high yielding variety (HYV) seeds, chemical fertilizers, insecticides and pesticides in order to obtain higher productivity.

Three main crop season of India

Kharif - Rabi - Zaid

1. **Kharif –** If starts with the onset of monsoon and continues till the beginning of winter (June-July to September – October) The Kharif crops include rice, maize, millet, cotton, jute, groundnut, moong, urad etc.
2. **Rabi –** It starts with the beginning of winter and continues till the beginning of summer (Oct-Dec to April June). The rabbi crops include wheat, barley, gram and oilseeds..
3. **Zaid –** This is a short crop season in between the rabbi and Kharif seasons. Crops like watermelons, cucumber, some vegetables and fodder crops are the major crops.

Major crops of India

1. Rice :

i. It is the staple food crop of a majority of the people in India.
ii. It is a Kharif crop which requires high temperature and high humidity with annual rainfall above 100cm
iii. Rice is grown in the plains of North and north eastern India, coastal areas and the deltaic regions of canal irrigation and tube wells have made it possible to grow rice.
iv. In areas of less rainfall such as Punjab, Haryana and western U.P. and parts of Rajasthan.

2. Wheat:

i. It is the main food crop in north and north western part of the country.
ii. This rabbi crop requires a cool growing season and a bright sunshine at the time of ripening.
iii. It requires 50-70 cm of annual rainfall.
iv. There are two important wheat growing zones in the country.
v. The Ganga Satuj plains in the North West and black soil regions of the Deccan.
vi. The major wheat producing states are Punjab, Haryana, U.P., Bihar, Rajasthan and parts of Madhya Pradesh.

3. Millets:

i. Jowar, Bajra and ragi are the important millets grown in India.
ii. It is a main fed crop mostly grown in moist areas which hardly needs irrigation.
iii. Rabi is a crop of dry regions and grows well on red, black, sandy, loamy and shallow black soils.
iv. Karnataka is the largest producer of ragi followed by TamilNadu.

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4. Maize :

i. It is a crop which is used both as a food and fodder.
ii. It is a Kharif crop which requires temperature between 21oC to 27oC and grows well in old alluvial soil.
iii. Major maize producing states are Karnataka, U.P., Bihar, Andhra Pradesh and Madhya Pradesh.

5. Pulses :

i. India is the largest producer as well as the consumer of pulses in the world.
ii. These are the major source of protein in vegetation diet.
iii. Major pulses that are frown in India tur, urad, moong, masur peas and gram.
iv. Pulses need less moisture and survive even in dry conditions.
v. Major pulses producing states in India are Madhya Pradesh, U.P., Rajasthan, Maharashtra and Karnataka.

Non food Crops

- Rubber - Fibre Crops - Cotton - Jute

1. Rubber:

i. It is an equatorial crop

ii. ii. But under special conditions it is also grown in tropical and sub tropical areas.
iii. It requires moist and humid climate with rainfall of more than 200cm and temperature above 25oC
iv. It is mainly grown in Kerala, Tamil Nadu, Karnataka and Andaman and Nicobar Islands and Garo hills in Meghalaya.

2. Fibre Crops:

i. Cotton, Jute, hemp and natural silk are the four major fibre crops grown in India.
ii. The first three are derived from the crops grown in the soil; the latter is obtained from cocoons of the silkworms fed on green leaves especially mulberry.
iii. Rearing of silk worms for the production of silk fibre is known as sericulture.

3. Cotton :

i. Cotton grows well in drier parts of the black cotton soil of the Deccan Plateau.
ii. It requires high temperature, light rainfall or irrigation, 210 frost free days and bright sunshine for its growth.
iii. It is a Kharif crop and requires 6-8 months to mature.
iv. Cotton producing states are M.P., Karnataka, Andhra Pradesh, Tamil Nadu, Punjab, U.P. and Haryana.

4. Jute :

i. It is also known as Golden fibre.
ii. Jute grows well on well drained fertile soils in the flood plains where soil are renewed every year.
iii. It requires high temperature.
iv. Major Jute producing states are Bihar, Assam, West Bengal, Odisha, and Meghalaya.

Food Crops Other Than Grains

- Sugarcane - Oil Seeds
- Tea - Coffee

1. **Sugarcane:** it is a tropical as well as subtropical crop. It grows well in hot and humid climate with a temperature of 21oC to 27OC and an annual rainfall between 75 cm to 100cm. Irrigation is required in the regions of low rainfall. The major sugarcane producing states are Uttar Pradesh, Maharashtra, Karnataka, and Tamil nadu, Bihar, Punjab and Haryana.
2. **Oil Seeds:** In 2014 India was the second largest producer of groundnut in the world after China. Ground Nut is a Kharif crop and accounts for about half of the major oilseeds produced in the country. Linseed and mustard are Rabi crops. Sesamum is a Kharif crop in north and Rabi crop in South India. Castor seeds are grown both as Rabi and Kharif crop.
3. **Tea:** Tea cultivation is an example of plantation agriculture. It is also an important beverage crop introduced in India initially by the British. Tea bushes require warm and moist free climate all through the year. Frequent showers evenly distributed over the years ensure continuous growth of tender leaves. Major tea producing states are Assam, hills of Darjeeling and jalpaiguri districts, west Bengal, Tamil nadu and Kerala.
4. **Coffee:** In 2014 India produced 3.5 per cent of the world coffee production. Indian coffee is known in the world for its good quality. Initially its cultivation was introduced on the Baba Budan Hills and even today its cultivation is confined to the Nilgiri in Karnataka, Kerala and Tamil Nadu.

Technological and Institutional reforms

1. It was mentioned in the previous pages that agriculture has been practised in India for thousands of years.
2. Agriculture which provides livelihood for more than 60 percent of its population need some serious technical and institutional reforms.
3. Thus collectivisation, consolidation of holding, cooperation and abolition of Zamindari etc. were given priority to bring about institutional reform in the country after independence.
4. Kissan credit Card (KCC), Personal Accident Insurance Scheme (PAIS) are some other schemes introduced by the Government of India for the benefits of the famers.
5. The government also announces minimum support price MSP remunerative and procurement prices for important crop to check the exploitation of famers by speculators and middlemen.

Impact of Globalisation on Agriculture.

1. Globalisation is not a new phenomenon. It was there at the time of colonisation.
2. In the nineteenth century when European traders came to India, at that time too. Indian spices were exported to different countries.
3. Under globalisation particularly after 1990, the farmers in India have been exposed to new challenges.
4. Despite being an important producer of rice, cotton, rubber, tea, coffee, Jute and spices over agricultural products are not able to compete with developed countries.
5. Indian farmers should diversify their cropping pattern from cereals to high value crops.
6. This will increase income and reduce environmental degradation simultaneously.

Exercises

Project work

1. Group discussion on the necessity of literacy among farmers.
2. On an outline map of India show wheat producing areas.

QUESTINS BANK

Very short Answer type questions

1. What is agriculture?

The art and science of cultivation soil, raising crops and rearing crops and rearing stock including animal husbandry and forestry.

2. Name any four agricultural products exported by India.

1 TEA 2 COFFEE
3 SPICES 4 JUTE

3. What is primitive subsistence farming?

It is a type of agriculture / farming which is practised on small patches of land with the help of primitive tools like hoe, DOA, digging sticks and family/ community labour.

4. Name any four states which are the main producers of KHARIF crops.

1 ASSAM 2 WEST BENGAL
3 ANDHRA PRADESH 4 TAMIL NADU

5. What is the period of kharif crops?

Kharif season starts with the onset of the beginning that is June- July and continues till the beginning of winter that is October – November.

6. Which country is the largest producer of rice in the world?

China

7. What is horticulture?

Intensive cultivation of vegetables, fruits and flowers is known as horticulture.

8. What is white Revolution?

Increase in production of milk is known as white revolution. It is also known as operation flood.

9. What is Gross cultivated Area?

The net sown area and the land cultivated more than once together make gross cultivated area.

10. Name any two dry crops?

Jawa, bajra.

11. What is dry land farming?

It is a type of faming which is practised in scanty rainfall areas and where irrigation facilities are inadequate. Example, cultivation of jawar and bajra.

12. Name two natural fibres except cotton.

Jute and flax

Short answer type questions

1. Define the following terms;

a) Agriculture
b) Kharif crops
c) Zaid crop

a) Agriculture: The art and science of cultivating soil, raising crops and rearing livestock including animal husbandry and forestry.

b) Kharif crops: The kharif season starts with the onset of the monsoon that is June – July and continues till the beginning of winter that is October- November.

c) Zaid crops: These are crops which are sown between the Rabi and kharif crops. Watermelon, musk melon, cucumber and vegetables are some examples of the zaid crops.

2. Mention any four features of the primitive's subsistence farming.

I. Primitive's subsistence agriculture is practised on small patches of land with the help of primitive tools like hoe, Dao and digging sticks with the help of family/community labour.
II. This type of farming depends upon the monsoon, natural fertility of the soil and suitability of other environmental conditions for the crops to be grown.
III. Under this, farmers produce for self – consumption.
IV. Per hectare availability of land is very low.

3. What is intensive subsistence farming? Mention its two features.

This type of agriculture is practised in those areas or regions, or countries where the cultivable land is limited and the density of population is very high. Major features of intensive agriculture are;

I. Per hectare yield is high.
II. Farmers apply modern inputs like fertilizers, pesticides, high yielding varieties of seeds, etc.., to obtain high yield.

4. What is the importance of rubber for the Indian economy?

I. Rubber is an important industrial raw material.
II. It is used in automobile industry.
III. It is also the major input for the footwear industry.
IV. India earns foreign exchange by exporting raw rubber and rubber products.

5. Name any four factors that have distorted the cropping pattern in India

I. High minimum support price.
II. High subsidies for various inputs.
III. Committed FCI purchases.
IV. Assured means if irrigation

6. Name the state which is the leading producer of rubber. Give two reasons.

Kerala leads in the production of rubber because:

a) Rubber requires high temperature and heavy rainfall throughout the year.
b) It requires cheap labour which is easily available in Kerala.

Long answer type questions

1. Why subsistence agriculture is still practiced in certain parts of the country? GIVE four reasons.

A farming in which the main production is consumed by the farmer's household is known as subsistence farming.

Features:

I. Old technology and traditional implements are used.
II. Agricultural fields are small and farmers possess scattered land holdings.
III. Most of the farmers are poor, and do not us fertilizers and HYU seeds.

2. What is plantation agriculture? Write some features of the plantation agriculture.

This is a type of agricultural which involves growing and processing of a single cash crop purely meant for sale. Rubber, tea , coffee, spices, coconut and fruits are some of the important crops which come under the category of plantation agriculture.

Features:

I. It is a single crop farming
II. It is a capital intensive farming that is huge amount of capital is required.
III. It needs vast estates, managerial ability, technical knowhow, sophisticated machinery, fertilizers, good transport facilities and a factory for processing.
IV. This type of agriculture has developed in areas of north-eastern India, sub- Himalayan region, west Bengal and Nilgiri.

3. Describe the temperature and climatic conditions required for the cultivation of sugarcane. Name two leading producers.

I. Temperature: sugarcane needs hot and humid climate with temperature ranging between 21c to 27c. Very high temperature is harmful for its growth. It cannot withstand frost. Cool temperatures are needed at the time of ripening.

II. **Rainfall:** it grows best in areas receiving 75 cm to 100 cm of rainfall results in low sugar content.

III. **Soil:** sugarcane grows on well-drained fertile soil. It can grow on a variety of soils including black, alluvial, loamy and reddish loam

SUGARCANE:

But the best soil is the alluvial soil of the Ganga plain and the black soil of southern India. Sugarcane exhausts the fertility of the soil. Hence, the use of manure is essential to ensure high yields..

AREAS OF PRODUCTION: Uttar Pradesh is the largest producer of sugarcane. The other states in the Ganga-plain are Bihar, Punjab and Haryana.

4. Explain the climatic conditions required for the production of cotton. Also mention the major cotton producing stats in India.

i. **Temperature:** cotton needs a warm climate. Summer temperature of 21c to 27c, and abundant sunshine is necessary during the growth of the plant. A long growing period of the plant. A long growing period of at least 210 frost-free days is also necessary for the plant to mature.

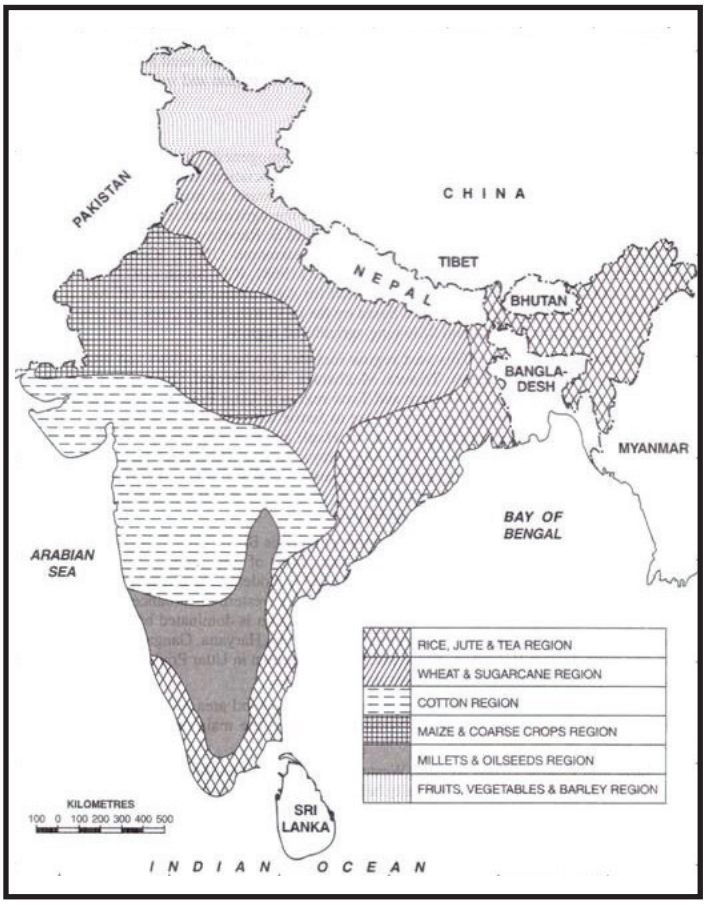
ii. **Rainfall:** modern to light rainfall is adequate for cotton cultivation. Rainfall ranging between 50 cm to 80cm is adequate. The crop can be successfully grown in areas of low rainfall with the help of irrigation.

iii. Soil: cotton can be grown on a variety of soil but the black cotton soil of the Deccan Plateau which has the ability to retain moisture is most suitable. It also grows well in alluvial soils of the Satluj-Ganga plain.

AREAS OF PRODUCTION:

The leading cotton producing states are Gujarat, Maharashtra, Andhra Pradesh, Punjab, Haryana, Karnataka, Tamil Nadu and Madhya Pradesh.

Punjab and Haryana grows the long staple variety.



CHAPTER 1

POWER SHARING

1. 'ETHNIC'

Ethnic means a social division based on shared culture and common descent. People belonging to an ethnic group need not have the same religion or nationality.

STORY OF BELGIUM

- Belgium is a small country in Europe which has a population of a little over one core.
- The ethnic composition of this small country is very complex.
- Out of the total population of the country, 59 percent lives in the Flemish region and speaks Dutch language. Another 40 percent people live in the Wallonia region and speak French. Remaining one percent of the Belgians speaks German
- In Belgium's capital, Brussels, 80 percent speak French while 20 percent are Dutch speaking.
- The minority French- speaking community was relatively rich and powerful.
- This made Dutch speaking community angry as they benefit of economic development and education much later.
- During the 1950s and 1960s, tensions between the Dutch- speaking and French- speaking communities created due to these differences.

STORY OF SRI LANKA

➢ Sri Lanka is an island nation, south of India having diverse population of about two core people.

➢ The major social groups are the Sinhala speakers (74 percent) and the Tamil – speakers (18 percent).

➢ Tamils are divided into two groups ;

- Sri Lankan Tamils (13 percent) – Tamil natives of the country
- Indian Tamils (5 percent) – came from India during colonial period as plantation workers.

➢ Most of the Sinhala- speaking people are Buddhists, while most of the Tamils are Hindus or Muslims.

➢ There are about 7 percent Christians, who are both Tamil and Sinhala

Majoritarianism in Sri Lanka;

❖ The democratically elected government adopted a series of Majoritarian policy measures to establish Sinhala supremacy. These are ;

- Sinhala as the only official language.
- The governments followed preferential policies that favored Sinhala applicants for university positions and government jobs.

❖ These decisions gradually increased the feeling of alienation among the Sri Lankan Tamils.

❖ The Sri Lankan Tamils launched parties and struggles for the recognition of Tamil as an official language, for regional autonomy and equality of opportunity in securing education and jobs.

❖ By 1980s several political organizations were formed demanding an independent Tamil Eelam (state) in northern and eastern parts of Sri Lanka.

❖ It soon turned into civil war.

ACCOMMODATION IN BELGIUM

- Between 1970 and 1993, Belgian's constitution amended four times to work out an arrangement that would make everyone to live together.
- The elements of the Belgian model;

➢ Constitution prescribes that the number of Dutch and French – speaking ministers shall be equal in the central government.

➢ Many powers of the central government have been given to state governments of the two regions of the country.

➢ Brussels has a separate government in which both the communities have equal representation.

➢ There is also provision of 'community government' elected by people belonging to one language. Community which has the power regarding cultural, educational and language – related issues.

WHY POWER SHARING IS DESIRABLE?

1) Thus, two different sets of reasons can be given in favor of power sharing.
2) Firstly, power sharing is good because it helps to reduce the possibility of conflict between social groups.
3) There is a second, deeper reason why power sharing is good for democracy. Power sharing is very spirit of democracy. A democratic rule involves sharing power with those affected by its exercise, and who have to live with it effects.

4) Let us call the first set of reasons PRUDENTIAL and the second MORAL.
5) While prudential reasons stress that power sharing will bring out better outcomes, moral reasons emphasizes the very act of the power sharing valuable.

FORMS OF POWER- SHARING

- In modern democracies, power sharing arrangements can take many forms.

❖ Horizontal distribution of power. Power is shared among different organs of government, such as the legislature, executive and judiciary Example; INDIA

❖ Federal government (vertical distribution of power): power can be shared among governments at different levels- a general government for the entire country and governments at the provincial or regional level. Example: USA

❖ Power may also be shared among different social groups such as the religious and linguistic groups. Example: 'community government' in Belgium.

❖ Power sharing arrangements can also be seen in the way political parties, pressure groups and movements control or influence those in power.

QUSTION BANK

Multiple Choice

1 In Belgium, the percentage of French community is

a) 54%
b) 40%
c) 30%
d) 20%

2. Belgium shares its boarder with

a) France
b) Germany
c) Luxembourg
d) All of above

3. The capital city of Belgium is

a) Dutch
b) France
c) Brussels
d) None of above

4. Power struggle demanding separate Eelam was launched by

a) Sinhalese
b) Buddhists
c) Tamilians
d) None of above

5. Majoritarianist constitution was adopted by

a) Belgium
b) India
c) Sri Lanka
d) Pakistan

VERY SHORT ANSWER TYPE QUESTIONS

1. Which are the most important social groups of Sri Lanka?

Answer :
i) Sinhala Speakers ii) Tamil Speakers

2. When did Sri Lanka emerge as an independent nation?

Answer : 1948

3. What is a civil war?

Answer : It is a violent conflict between the opposing groups within a country for example the conflict between Sinhalese and Indian Tamils in Sri Lanka.

4. Name the ethnic group of Sri Lanka which are involved in a civil war.

Answer : i) Sri Lankan Tamils or the Sinhalese
ii) Indian Tamils

5. State one prudential reason and one moral reason for power sharing from the Indian content.

Answer : i) India is a multicultural Society
ii) India is a democratic country.

6. Name the most important organs of the government

Answer : Legislature, executive and judiciary.

7. In Sri Lanka the democratically elected government adopted a series of which measures to establish Sinhala Supremacy? Mention any one.

Answer : They establish a majoritarian government.

8. State two main base of social division in Sri Lanka.

Answer : i) Religion ii) Language

9. which type of power sharing is called checks and balances?

Answer : Horizontal distribution of power.

10. Which two languages are generally spoken in Belgium?

Answer : French and Dutch

11. Give one example of horizontal sharing of power.

Answer : Power sharing among legislature, executive and judiciary.

12. Who elects the community government in Belgium?

Answer : People belonging to one language community Dutch, French and German.

SHORT ANSWER TYPE QUESTION

1. What is the ethnic composition of Belgium?

Answer : The ethnic composition of Belgium a small country is very compliuseof the country's total population,

59 per cent live in the Flemish region and speak Dutch language. Another 40 per cent people live in the Wallonia region and speak French, Remaining 1 per cent of the Belgians speak German. In the capital city, Brussels about 80 per cent people speak French while 20 per cent are Dutch speaking.

2. Mention any four steps which were taken by the Sri Lankan government to achieve majoritarianism.

Answer :

i) In 1956, an Act was passed under which English was replaced as the country's official language not by the Sinhala and Tamil but by the Sinhala only.

ii) The government followed preferential policies that favoured the Sinhala applicants for university positions and government jobs.

iii) A new constitution stipulated that the state shall protect and foster Buddhism.

iv) Denial of citizenship to estate Tamils.

3. What is the relationship between democracy and power sharing?

Answer : 'Democracy' means giving every citizen the right and power to make the decision through their elected representatives. Power sharing is dividing power among various social groups to given them equal representation in the governance power sharing is the essence of democracy where every individual, irrespective of cultural and language difference feel involved in the political system.

4. what is power sharing? Explain

Answer : i) The concept of providing a permanent share of power in the government different communities or regions is termed as power sharing.

ii) Under this the people and the leaders of the nation respect the feelings and regions.

iii) The principle of power sharing is very important for the unity and growth of democracy.

5. Explain the principle of federal division of power.

Answer : i) Under the federal division of power the power is divided among different levels of government for example in India the power is shared among the three levels of government i.e., Union government, the state governments and the local government.

ii) This type of system is known as vertical division of power.

iii) Under this the constitution clearly lay down the power of each levels of government.

LONG ANSWER TYPE QUESTIONS

1. How were the ethnic problems solved in Belgium? Mention any four steps which taken by the government to solve the problems?

Or

How is the political system in Belgium innovative and different from the other countries of the world? Explain any three points.

Answer : i) Equal number of ministers for both the groups : The Belgium constitution prescribes that the number of Dutch and French speaking ministers shall be equal in the central government. Some special laws require the support of majority of members from each linguistic group. Thus, no single community can take decisions unilaterally.

ii) More people to state government : Under the proper power showing arrangement, many power of the central government were given state government for the two regions of the country. The state governments were not subordinate to the central government.

iii) Equal representation at the state and the central level : A separate government has been set up at Brussels in which both the communities have equal representation.

iv) Formation of community government : Apart from the central and the state government, there is a third kind of government that is 'community government' This 'community government' is elected by the people belonging to one language community – Dutch, French and German speaking no matter where they live. This government has the powers regarding cultural, education at and language related issues.

2. Why is power sharing desirable?

Or

Why is power sharing necessary in democracy? Explain

Answer : 1. Prudential reasons :

i) Prudential reasons are based on careful calculations of gains and losses for example in the Nepal movement for democracy was the Maoists an aimed revolutionary group was given some share after the formation of government. The Major gain for this was peace in Nepal.

ii) Prudential reasons help to reduce the possibility of conflict between social groups.

iii) Prudential reasons are good way to ensure political stability.

iv) Imposing the will of majority community over the minority may look like an attractive option in the shout run, but in the long run, it under… the unity of the nation. Tyramny of the minority. It often brings ruins to the majority as well.

2. Moral reasons :

i) Power sharing is the basic spirit of democracy. A democratic rule involves the sharing of power with those affected by its exercise and those who have to live with its effects.

ii) A democratic government is chosen by the people. So they have the right to be consulted on how they are to be governed. A legitimate government is one where groups through participation, acquire a stake is the system.

iii) Decentralisation of power that is formation of state governments, local government is an example of moral reason.

CHAPTER 2

FEDERALISM

1. INTRODUCTION

Federalism is system of government in which the power is divided between a central authority and various constituent unites of the country. This vertical division of power among different levels of governments is referred to as federalism. Federalism is one of the major forms of power-sharing in modem democracies..

Key features of federalism are

1) Two or more levels of government.
2) Different levels of government govern the same citizens, where each level has its own jurisdiction in specific matters of legislation, taxation and administration.
3) Existence and authority of each level of government is constitutionally governed.
4) The fundamental provisions of the constitution cannot be unilaterally changed. Such changes require the consent of both the levels of government.
5) Courts have the power to interpret the constitution. The highest court acts as the umpire if any dispute arises between different levels of governments.
6) Sours of revenue for each level of government are specified to ensure its financial autonomy.
7) Federal system has dual objectives to safeguard and promote unity of the country, and to accommodate regional diversity.

UNION TERRITORIES

Some unites of the Indian union, which are too small to become an independent state and could not be merged with any of the existing states, are called union Territories. They are also called 'Centrally Administered Territories' for example, Chandigarh, Lakshadweep

Coalition government;

A government formed by coming together of at least two political parties. Usually, partners in a coalition form a political alliance and adopt common programmers.

For example, National Democratic Alliance (NDA), the United Progressive Alliance (UPA) and the left front.

INDIA FEDERAL COUNTRY:

The constitution declares India as a union of states. Although the word 'Federation' is not used, the Indian union is based on the principles of federation. The constitution originally provided for a two-tier system of government, the Union Government or the central Government representing union of India and the state Government. A third -tier of federation was added in the form of panchayats and Municipalities. As in any federation, these different tiers enjoy separate jurisdiction. The Constitution provides for a three-fold distribution of legislative powers between the union government and state government. It contains three lists:

- Union List (97 Subjects),
- State List (66 Subject),
- Concurrent List (47 subjects),

Since India is an example of 'holding together' federation where the Central Government is more powerful vis-à-vis the states, some states, for example, enjoy a special status like Jammu &Kashmir, which has its own constitution.

'COMING TOGETHER' FEDERATIONS;

This agreement induces independent states coming together on their own to form a bigger unit, so that by pooling sovereignty and retaining identity they can increase their security. Example are; USA, SWITZERLAND and AUSTRALIA.

'HOLDING TOGETHER' FEDERATIONS:

In this agreement, a large country decides to divide its power between the constituent states and the national government. The central governments tend to be more powerful vis-à-vis the states. Often different constituent units of the federation have unequal powers. Some units are granted special powers, for example, India, Spain, and Belgium.

SHARING OF POWER BETWEEN THE UNION GOVERNMENT AND STATE GOVERNMRNTS;

The sharing of power between the union government and state governments is basic to the structure of the constitution. The parliament cannot, on its own, change this arrangement. Any change has to be first passed by both the Houses of the parliament with at least two- third majority. It has then to be ratified by the legislatures of at least half of the total states. In case of any dispute about the division of powers, the High Courts and the Supreme Court make a decision.

REASONS FOR SUCCESS OF FEDERALISM IN INDIA;

- Clearly laid out constitutional provisions providing a three- fold distribution of powers in the three lists- Union list, State list and Concurrent list- between the union and state governments,
- The nature of democratic politics in our country.
- The creation of linguistic states. Boundaries of several old states of India were changed in order to create new states. This was done to ensure that people who spoke the same language lived in the same state.
- Restricting of centre – state relation..

LANGUAGE POLICY OF INDIA;

Our constitution did not give the status of national language to any one language. The formation of linguistic states united the country and made administration easier. The leaders of our country adopted a very cautious attitude in spreading the use of Hindi. Hindi was identified as official language besides Hindi, there are 21 other languages recognized as scheduled languages by the constitution.

DECENTRALISATION IN INIDA

- When power is taken away from central and state governments and given to local government, it is called decentralization.
- Before 1992, the local bodies were directly under the state governments.
  - Regular elections were not held.
  - The local bodies did not have any resources or powers of their own.
- After 1992, the constitution was amended to make the third- tier of democracy more powerful and effective. The steps taken are
  - Mandatory to held regular elections to local government bodies.
  - Seats are reserved for the scheduled castes, scheduled Tribes and other backward classes.
  - At least one-third of all positions is reserved for women.
  - An independent institution called the state Election commission has been created in each state.
  - The state government are required to share some powers and revenue with local government bodies

RURAL LOCALGOVERNMENT

- Popularly known by the name Panchayati raj.
  - Gram panchayat; it is the decision- making body for the entire village.
  - Panchayat samiti; A few gram panchayats are grouped together to form what is usually called a panchayat samiti or block or mandal.
  - Zillaparishad; all the panchayat samitis or mandals in a district together form the zillaparishad.

URBAN LOCAL GOVERNMENT ;

In large urban areas, there are corporations and in smaller urban areas, there are municipal corporations.

QUSTION BANK

Q1. Multiple choice questions

1. The coming together federation is

a. India
b. Spain
c. USA
d. Australia

2. Indian official language is

a. Hindi
b. English
c. Urdu
d. None of these

3. The municipal officers are called

a. Mayors
b. MCAs
c. Sarpanch
d. None of these

4. To make India a strong federation, we need

a. Written constitution
b. Rigid constitution
c. Independent Judiciary
d. All of the above

5. Federations have been formed with the two kinds of

a. States
b. Routes
c. People
d. None of above

Very Short Answer Type Questions

1. What is federalism?

Answer : Federalism is a system of government in which power is divided between a central authority and its various constituent units. The various constituent units and the central authority run their administration independently and do not interfere unnecessarily in the affairs of one another.

2. Name any two holding together federalism.

Answer : USA and Australia

3. What is a state list/

Answer : It comprises those important subjects on which the state government can pass laws. Subjects like police,

local government, trade and commerce agriculture within the state are included in the state list. The state list has 66 subjects.

4. who is a Mayor?

Answer : He is an elected chairperson of the Municipal Corporation.

5. How many languages have been recognised as scheduled language?

Answer : 22 languages

6. Who govern the Union Territories?

Answer : The union Government

7. What are Union Territories?

Answer : These are areas which are too small to become an independent state but which could not be major with any of the existing state.

8. Name any two holding together federation

Answer : India and Spain

9. What is Gram Panchayat?

Answer : It is a council consisting of several ward members, often called panch and a president or sarpanch.

10. what is Panchayat Samiti?

Answer : A few gram panchayats are grouped together to form a panchayat samiti or block or mandal.

11. Which two languages have been identified as the official languages?

Answer : English and Hindi

12. What is Zilaparishad?

Answer : All the panchayat samitis or mandals in a district together constitute the ZilaParishad.

Short Answer Type Questions

1. Mention any four features of federalism

Or Explain four features of the federal form of government.

Answer : i) The power is divided between a central authority and its various constituent units.

ii) Different tiers of the government govern the same citizens.

iii) The fundamental provisions of the government can not be unilaterally changed by one level of government.

2. Mention any four difficulties of the local government in India.

Answer : i) Most states have not transferred significant powers to the local governments.

ii) There is a shortage of resources.

iii) Elections are not held regularly.

iv) The Gram Sabhas are not held regularly.

3. What are the advantages of local government?

Answer : i) Constitutional status for local government has helped to deepen democracy in our country.

ii) It has also increased women's representation and voice in our democracy.

iii) This allows people to directly participate in decision making.

iv) Local people have better ideas and knowledge about the local problems.

4. Explain two achievements and two difficulties of the local self governments in India.

Answer : Achievements

i) It has made the country more united and stronger.

ii) It has also made the administration easier.

Difficulies

i) There is a shortage of resources

ii) elections are not held regularly.

5. What is Gram Sabha? Mention its functions.

Answer : Every adult of the village who is 18 years of age constitute the Gram Sabha.

i) It is the decision making body of the entire village.

ii) The village panchayat works under the supervision of the Gram Sabha.

iii) It approves the annual budget of the Gram Panchayat.

6. What is a Panchayat Raj? What is its importance?

Answer : The rural local government is known as the Panchayat Raj Importance:

i) It helps the people to directly participate in decision making.

ii) It helps in the decentralisation of power.

iii) It reduces the burden of the central government.

7. Define :

a. Gram Panchayat

b. Panchayat Samiti

c. ZilaParishad

d. Mayor

Answer : a) It is a council consisting of several ward members often called the panch and a president or a sarpanch.

b) A few gram panchayats are grouped are grouped together to form a panchayat samiti or block or a mandal.

c) All the panchayat samities or Mandals in a district together constitute the ZilaParishad.

d) A mayor is an elected chairperson of the Municipal Corporation.

LONG ANSWER TYPE QUESTIONS

1. Distinguish between the coming together federations and the holding together federations.

Answer : Coming together federations

i) Under this the independent states come together on their own to form a bigger unit.

ii) under this all the constituent states usually have equal powers

iii) USA, Switzerland and Australia

Holding together federations

i) Under this, a large country decides to divide it power between the constituent states and the national government.

ii) Under this central government tends to be more powerful

iii) India, Spain and Belgium

2. What is decentralization? What is the importance or need for decentralisation?

Answer : When power is taken away from the central and State governments and given to the local government it is called decentralisation.

i) The basic idea behind decentralisation is that there are a large number of problems and issues which are best settled at the local level. People have a better knowledge of problems in their localities. They also have better ideas on where to spend money, and how to mange things more efficiently.

ii) At the local level, it is possible for the people to directly participate in making decisions properly. So that it can help to build a habit of democratic participation. Basically the local government is the best way to realise one important principle of democracy, namely the local self government.

3. Explain the advantages of decentralisation

Or

Explain any four features of the third lieu of government.

Answer : i) Locals have better knowledge : The basic idea behind decentralisation is that there are a large number of problems and issues which are best settled at the local level. People have better knowledge of problems in their localities. They also have better ideas on where to spend money, and how to manage things more efficiently.

ii) Direct participation of the people: Decentralisation makes it possible for the people to directly participate in decision making. This helps to inculeate a habit of democratic participation. The local government is the best way to realise one important principle of democracy namely the local self government.

iii) Foundation of democracy : Local government are most important in a democratic system. These are training schools for local citizens and local leadership. These provide political education. The people get familiar about the electoral process, and the proper use of thir vote, which is the very foundation of democracy.

iv) Reduction of burden of the central government : It reduces the burden of the central or state government. These can concentrate on matters of national or state importance in a better way. In this way, the local self government ensures efficiency everywhere, at all the three levels of todays government. Indian leaders have recognised the need for decentralised.

v) Women empowerment : At least one third of all positions are reserved for women in all the local bodies. This has lead to women empowerment.

CHAPTER 1

DEVELOPMENT

1. INTRODUCTION

Development defined as growth, development promises a real growth by enhancing total income and standard of living of a person. Different people have different developmental goals. The development goals are varying from people to people.

2. INCOME AND OTHER GOALS

- People desire regular work, better wages and decent price for their crops or other products.
- Also seek equal treatmentoffreedom, security,and respect of others and resent discrimination.
- Money or material things that one can buy with it, is one factor on which life depends. Quality of our life also depends on non-martial things.
- Before accepting a job, one looks at facilities for your family, working atmosphere or opportunity to learn.

3. NATIONAL DEVELOPMENT

National development refers to ability of a nation to improve standard of living of its citizen's.Standards of living of citizens depend upon per capital income. Gross Domestic products, literacy rate and availability of health etc.This improvement.

4. HOW TO COMPARE DIFFERENT COUNTRIES OR STATES?

- We can compare different countries or states on the basis of per capital income.
- We cannot take national income to compare different countries because each country has different population rate.
- Per capita income of a country shows the standard of living of the citizens of that particular company.
- A country with higher per capita income is more developed than others with less percapita income.

5. INCOME AND CRITERIA

- For achieving development goal of people, people not only want better income, they also want non-material things like, freedom, security, and respect of others.
- For development of a nation average income or per capital income is needed.
- In comparison of per capita income of states, Punjab has Rs.60,746/- and Bihar has Rs. 16715/- per capita income respectively.In this case Punjab would be considered most developed and Bihar least developed.
- But in another comparison of infant mortality rate

  PUNJAB- 34per thousand, KERALA—13per thousand, BIHAR—43per thousand

  These shows besides income, all other goals are equally important

6. PUBLICE FACILITIES

Facilities which are provided by the government considered as public facility like schools, hospitals, community halls, transport, electricity etc. As we know that Punjab has more income than the average person in Kerala but Kerala has a low infant mortality Rate because of better public system like, public system like, public Distribution system which provide Health and nutritional status to the state. We need public facility because we are not able to purchase all things by money. We cannot able to buy a pollution free environment with the help of money.

7. SUSTAINABILITY OF DEVELOPMENT

- Development should take splace but without harming environment.
- Example; Groundwater is under serious threat of overuse.
- Groundwater is an example of renewable resource; it is re perished by nature as in the case of crops and plants.
- Consequences of environmental degradation do not respect national and state boundaries-Our future is linked together.
- Sustainability of development is a new area of knowledge in which scientists, economists, philosophers and others social scientists are working together.

HUMAN DEVLOPMENT INDEX

It is defined as a composite statistic of life expectancy, education and precipitate income indicators, which are used to rank countries in four tiers of human developments. It has three indicators

- Life expectancy defined as the average number of years that a new born could expect to live if he or she were to pass through life, subject to the age specific mortality rates of a given period.

- Gross environment ration is determined by the number of students enrolled in school at several different grade levels.
- Per capita income is the main income of the people in an economic unit, calculated by total income divided by the total population.

Adding the three indicates and dividing it by 3 gives us the human development index.

HDI=Life exp. Index gross Enrolment ratio+ per capita income index.

- **INFANT MORTALITY RATIO ;** Infant mortality ratio indicates the number of children who die before the age of one year, as a proportion of 1000 live children born in that particular year.
- **LITERACY RAT**E; literacy rate measures the proportion of literate population in the 7 and above age group.
- **NET ATTENDANCE RATIO;** Ii id the total number of children of age group 14and 15 years who attending school as a percentage of total number of children in the same age group.

Question Bank

Q. Multiple Choice Questions

1. Per capita income of low income countries is
a. Rs. 30000 or less
b. Rs. 37000 or less
c. Rs. 40000 or less

2. IMR stands for
a. Infant mortality ratio
b. Indian Mortality ratio
c. International Mortality ratio
d. None of These

3. Development criteria include
a. Income
b. Equal treatment
c. Freedom
d. All of these

4. Meaning of development is different for
a. Different People
b. Alien People
c. Same People
d. None of these

5. Per capita Income of Kerala is higher than that of
a. Biker
b. Punjab
c. Gujarat

4. None of these

Q. Very Short Answer type questions

1. What is development?

Answer : It is a comprehensive term which includes increase in real per capita income, improvement in living standard of people, reduction in poverty etc.

2. Mention any two development goals of people other than income?

Answer : i) Equal treatment
ii) Respect of others

3. What is national development?

Answer : National development is a comprehensive term which includes improvement in living standard of the people, increase in per capita .

4. What is the most important emponent for comparing deficient countries?

Answer : Per capita income

5. What is infant mortality rate?

Answer : It indicates the number of children that die before the age of one year as a proportion of 2000 live children born in that particular year.

6. What is literacy rate?

Answer : It measures the proportion of literate population in the seven and above age group.

7. Why Kerala has a low infant mortality rate?

Answer : Because it has adequate provisions of basic health and educated facilities.

8. What is public distribution system?

Answer : It is a food security programme under which government provide food grains and other essential items to the poor at an affordable price.

9. Mention any two parameters where Sri Lanka has scored over India in HDI.

Answer : i) Per capita income
ii) Literacy rate

10. name the region of world which has large crude oil reserve.

Answer : Middle East

11. What are non renewable resources? Give one example.

Answer : "Non renewable resources are the natural resources that cannot be replaced at all a within a reasonable time". Fossil fuels such as oil, gas and coal are examples of non- renewable resources. These resources accumulated over millions of years.

12. Mention any two development goals of a girl.

Answer : i) Gender equality
ii) Girls empowerment

Q. Short Answer type questions

1. Define the term 'average income

Answer :

i) Development is a comprehensive term which include increase in real per capita income, improvement in living standard of people, reduction in poverty, illiteracy, crime rate etc.

Features

a) Different persons have different developmental goal

b) Income is a major component of development.

ii) National income is defined as the total value of all the goods and services produced within a country plus not income coming from abroad.

iii) When the total national income is divided by the total

population, it is called the per capita income.

2. What is sustainable development?

Answer :

i) Per capita income, life expectancy at birth literacy rate and other basic necessities like clean drinking water, sanitation etc.

ii) Sustainability of development

iii) It is the process of enlarging people's choices as well as raising the level of well being so that can lead a purposeful and a creative life. Though the national income and the per capita income are the indicators of human development, but it includes many other elements like consumption health, environment, education, freedom, security, non-violent atmosphere, etc.

iv) Sustainable development is that process of economic development which aims at maintaining the quality of life of both the present and the future generations without harming the natural resources and environment.

v) UNDP

a) Educational level b) Health status

c) Per capita income

3. Mention any four characteristics of development.

Answer :

i) Different people have different developmental goals

ii) What may be development for one may bot be development for the other. It may be destructive for the other.

iii) Income is the most important component of development, but along with income, people also seek equal treatment, good health, peace, literacy, etc

iv) For development, people look at mixed goals.

4. What may be development for one may not be development for the other. Explain by giving examples.

Answer : It is true development for one may not be development for the other.

i) More wages means development for a worker, nut it can go against the entrepreneur.

ii) A rich farmer or trade wants to sell food grains at a higher price but a poor worker wants to purchase it for low prices.

iii) Construction of a dam means more and cheap power, but people, who will lose their habitat will demonstrate.

iv) To get more electricity, the industrialists may want more dams. But this may submerge the agricultural land, and disrupt the lives of the people.

5. What is national development? What are the aspects covered under the national development?

Answer : National development is a comprehensive term which includes improvement in living standard of the people increase in per capita income, providing social amenities like education, medical care, social services etc. to the citizens of the country.

i) Under national development a country uses its resources in a fair and just way.

ii) Under this only those programme and policies are implemented which would benefit a large number of people.

iii) Under national development countries focus more on social infrastructure which includes education, health and other social services.

6. What is the importance of Human Development Index?

Answer :

i) It indicates the level of development of a country.

ii) It indicates to a country how far it has travelled, and how far it has yet to travel to achieve a high rank.

iii) Through it, one comes to know the important elements of economic welfare like life expectancy level of education attainment and the real per capita income.

iv) Human development index can be used for long term planning.

7. Define the following terms:

i) IMR ii) Literacy rate iii) NAR

Answer :

i) Infant Mortality Role (IMR) indicates the number of children that dic before the age of one year as a proportion of 1000 live children born in the particular year.

ii) Literacy rate measures the proportion of literate population in the 7 years and above age group.

iii) Net Attendance Ratio is the total number of children of age group 6-10 years attending school as a percentage of the total number of children in the same age group.

Long Answer Type Questions

1. what is the main criteria used by the World bank in classifying different countries? What are the imitations of this criteria?

Answer : The world development report, 2012, brought out by the world bank has given the following criteria in classifying countries..

i) rich or high income countries: Countries with the per capita income of US $12276 per annum and above in 2010, are called rich countries.

ii) Poor or low income countries : The countries with the per capita income of US$ 1005 or less, are called low income countries.

India comes in the category of low middle income countries because its per capita income in 2010 was just US$1340.4 per annum. The rich countries, excluding countries of middle, east and certain other small countries are generally called the developed countries.

Limitations:

i) It covers only the economic aspect ignoring peace, health, environment, education, longevity, etc.

ii) The method does not provide us the distribution of income.

CHAPTER 2

SECTORS OF THE INDIAN ECONOMY

1. INTRODUCTION

Sectors of Indian Economy are divided into three categories

- Primary Sector
- Secondary Sector
- Tertiary Sector

1. Primary Sector :-

a. When we produce a good by exploiting natural resources, it is an activity of primary sector.

b. Example : Agriculture, dairy, fishing, forestry etc.

c. This sector is known as agricultural and related sector.

2. Secondary Sector :-

a. Cover activities in which natural products are changed into forms through ways of manufacturing that we associate with industrial activities.

b. **Example :** Using cotton fibre from plants we spin yarn and weave cloth etc.

c. This sector gradually became associated with the different kinds of industries that came up it is also called as industrial sector.

d. Adding the sun of all the three sectors would give you the GDP, Gross Domestic Product.

e. Primary sector + Secondary Sector + Tertiary Sector = GDP

3. Tertiary Sector

a. These activities by themselves do not produce a good but they are an aid or a support for the production process.

b. For Example : Goods that are produced, in the primary or secondary sector would need to be transported by trucks or trains and then sold in wholesale and retail shops.

c. Since these activities generate services rather than goods. It is also known as the service sector.
   - Value of good services in the three sectors are calculated and then added up

Economists suggest that the values of goods and services should be used rather than the adding up the actual numbers

For example :- 1. A farmer grows cotton and sells it to the textile Industry.

2. Now the textile Industry makes it into a shirt, adds buttons and thread.

3. And sells it on a higher rate.

Intermediate goods are used up in producing final goods and services.

The value of final goods already includes the value of all the intermediate goods that are used in making the final good.

Importance of Tertiary sector

1. In any country there are several services which are required hospital.
2. The development of agriculture and industry leads to the development of services like transport, storage and trade.
3. Due to demand in income levels, there is rise in demand for more services.
4. New services based on information and technology and communication have become important and essential.

Underemployment

When more people are working than is needed, this situation is called underemployment.

- In rural areas
- In urban areas

In Rural Areas

1. All the family member work in the same field.
2. This means that even if we remove a lot of people from agricultural sector and provide them work somewhere else, the agricultural production will not be affected.

In Urban Areas

1. There are thousands of casual workers in the services sector, who search for daily employment.
2. Many of them don't find work everyday.
3. There are many others like rikshaw pullers or cart pushers on the street selling something, where they may spend the whole day but earn very little.

Division of Sector

• Organised Sector:

1. Terms of employment regular
2. Follow rules and regulations of factory act etc.
3. Employees register themselves with the government.
4. Security of work
5. Work for a fixed number of hours
6. If work more, paid overtime.

7. Get benefits like paid leave, payment during holidays, provident fund, gratuity etc.
8. Get medical benefits, drinking water, safe working environment..

*** Unorganised Sector :**

1. Small scattered units outside the control of government.
2. Rules and regulations are not followed.
3. Jobs are low paid and after not regular.
4. No provision for overtime, paid leave, holidays or leave due to sickness.
5. Employment is not secure.
6. They may be told to leave the job any time.
7. Lot of them are employed on their own doing small jobs.

How to protect the unorganised sector:

In Rural Areas

1. Vulnerable people are landless agricultural labourers, small and marginal farmers etc.
2. Nearly 80% rural households are marginal and small farmers.

In Urban Areas

1. Comprise of workers in small scale industry, casual workers etc.
2. Need Government's support for providing work and raw material.

SC/ST

- Majority workers from SC/ST and backward communities are in unorganised sector.

SECTORS ON BASIS OF OWNERSHIP

Public Sector

- Government owns most of assets and provides all the services.
- Example : railways, post office
- Meant for social effects and benefits.

Private Sector

- Ownership of assets and delivery of services is in the hands of private individuals.
- Example : Tata Iron and steel company of Reliance industries.
- Guided by motive to earn profit.

QUESTION BANK

Multiple Questions

1. Animal Husbandry is part of

a. Primary Sector b. Secondary sector
c. Tertiary Sector d. None of these.

2. Converting Iron are to steel is part of

a. Primary Sector b. Secondary Sector
c. Tertiary Sector d. None of these

3. ATM is an example of

a. Primary Sector b. Secondary Sector
c. Tertiary Sector d. All of these

4. Service is

a. Tangible b. Intangible
c. Both (a) and (b) d. Physical Product

5. Public health is responsibility of

a. Primary Sector b. Government
c. Private Sector d None of these

FILL IN THE BLANKS

1. Primary sector comprises the poorestsection of society in majority.
2. Activities in private sector are guided by motive to earn more profit.
3. Disguised Unemployment is a type of unemployment where more people are working than necessary.
4. Private sectors are outside the control of government.
5. Open unemployment is a situation where in large section of labour force does not get a job that could bring him regular income.

VERY SHORT ANSWER TYPE QUESTIONS

1. What are economic activities?
Answer : The activities which contribute ti the flow of goods and services in an economy.

2. What is secondary sector?
Answer : The secondary sector includes activities in which natural production are changed into other forms manually or through machines.

3. What is tertiary sector?
Answer : The sector which provide support service to both primary and secondary sectors for example banking trade communication etc.

4. What is GDP?
Answer : It is the value of all final goods and services produced within a country during a particular year.

5. What are final goods?
Answer : Final goods are the goods which are ready for use for example a pen.

6. What is right to work?
Answer : Under this right all those who are ready to work at prevailing wages are giving work by the government.

7. What is organized sector?
Answer : It is a sector which covers those enterprises or place of work. Where the terms of employment are regular and therefore people have regular work.

8. What is unorganised sector?
Answer : Any sector or industrial unit which is largely outside the control of the government.

9. Which sector is the largest employer?
Answer : Primary sector

10. Which sector has shown the biggest growth rate?
Answer : Tertiary rate

11. Give any two example of primary activities
Answer : i) Animal rearing ii) Lumbering

12. On what basis, the sectors are classified into public and private sector?
Answer : Ownership of enterprises

13. What is the main motive of private sector enterprises?
Answer : Profit making

SHORT ANSWER TYPE QUESTIONS

1. What is under employment? Explain with an example.
Answer : i)) It is situation under which people are apparently working but all of then are made to work less them their potential.

ii) For example to cultivate a field only two workers are required but the whole family of five people is working as they have nowhere else to go for work.

iii) This type of unemployment is also known as disguised unemployment.

2. What are secondary activities? Explain with examples.
Answer : The occupations which produce finished goods by using the products of primary activities as raw materials are included in secondary activity. Manufacturing of cloth from cotton, sugar from sugarcane and steel from iron ore are important examples of secondary activities.

All these are secondary activities because the final product is to be produced not by native but has to be made by men and therefore, some process of manufacturing is essential.
Let us take an example of cloth. Though the primary product, that is cotton is produced by nature, but ut cannot be used directly by us in this form. So to convert it into usable form. Some process of manufacturing is essential. This can be done in a factory or at home with simple tools.

3. What are tertiary activities? Explain with example.
Answer : Tertiary activities consists of all service occupation. Transport, communication, trade, health, education and administration are important.
Example : These tertiary activities help in the development of the primary and secondary sector. These activities, by themselves, do not produce a good, but they are an aid or a support for the production process. So these are also known as support services.

4. Who is responsible for collecting data for the GDP in India?
Answer : In India, the mammoth task of measuring the GDP is undertaken by a central government ministry. This ministry, with the help of various government departments of all the Indian states and union territories, collects information relating to the total volume of goods and services and their prices and then estimates the GDP.

5. What is an organised sector? Explain
Answer : i) An organised sector covers those enterprises or places of work where the terms of employment are regular and therefore, people have ensured work.

ii) They are registered by the government and have to follow its rules and regulations which are gives in various laws such as the factories act, minimum wages act, payment of gratuity act, shops act etc.

iii) They are called organised because they have some processes and procedures

LONG ANSWER TYPE QUESTIONS

1. Why is the tertiary sector becoming so important in India? Give at least four reasons
Answer : i) Basic Services : In any country, several services such as hospitals, educational institutions, post and telegraph services, police station, village administrative offices, municipal corporation, defence transport, banks, insurance companies etc. are required. These can be considered as basic services. In a developing country, the government has to take the responsibility for the provision of these services.
As more and more people are being employed to provide the basic services to the people, the share of the tertiary sector in the gross domestic product the GDP is increasing.

ii) Development of means of transport and communication
The development of agriculture and industry leads to the development of services such as transport communication, trade, etc. All these are under the tertiary sector.

iii) More income more services: The per capita income in our country is rising. As the income level rises, people demand more services like tourism, shopping centres, schools, professional gaining centres, banks, etc

iv) New Services : With modernisation and globalisation, some new services based an information and communication technology have become important and essential. The production of these services has been rising rapidly.

2. Explain how a shift has taken between sectors in developed countries..
Answer : i) At initial stages of development, it was the primary sector which dominated. Most of the people were employed in the primary sector only.

ii) With the introduction of new methods of farming and manufacturing people started working in other activities that is manufacturing. So secondary sector gradually became the most important in total production and employment.

iii) In the past 100 years the service sector has became the most important in terms of total production and employment.

iv) The domination of service sector is due to globalisation of the world economy.

3. How can workers in the unorganised sector be protected? Explain.

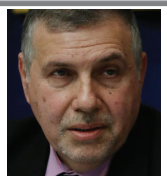
Answer : i) Government can fix the minimum wages rate and working hours.

ii) Government can provide cheap loans to the self employed people.

iii) Government can provide cheap and affordable basic services like education, health, food to those workers.

iv) Government can frame new laws which can provide provision for overtime, paid leave, leave due to sickness etc.

INFO JUNCTION



February 01, 2020

MOHAMMED ALLAWI

One of the former communication ministers of Iraq, Mr. Mohammed Allawi was appointed as the Prime Minister of the country. Allawi has been appointed the Prime Minister of the Country amidst long protests that has so far killed 600 in the country.

February 25, 2020

MOHAMMED HOSNI MUBARAK

The Egypt ruler Mohammed Hosni Mubarak died at the age of 91. He served as the President of Egypt between 1981 to 2011.

March 21, 2020

SATYARUP SIDDHANTA

The Indian Mountaineer Satyarup Siddhanta has entered 'Limca Book of Records'. He has set the record of becoming the first Indian to climb the highest volcano in the world. He already holds Guinness Book of World Records, India Book of Records, Asia Book of Records, British Book of records and Champion Book of Records.

March 28, 2020

EARTH HOUR

Since 2007, every year millions of people participate in the campaign called "Earth Hour" in March. This year, it was celebrated on 28 March 2020. It is a symbolic movement of "Lights OFF" to save the environment. The event is organized by the World wide Fund. The event was first started in Sydney, Australia. The aim of marking Earth Hour is to give attention towards global warming, climate change and loss of biodiversity. During the one-hour campaign, all over the world switch off lights and electronic items between 8:30 PM to 9:30 PM. The Earth Hour is held every year on the last Saturday of March.

March 29, 2020

AIR VICE MARSHALL CHANDAN SINGH RATHORE

The Mahavir Chakra recipient Air Vice Marshall Chandan Singh Rathore died at his Jodhpur residence. His services during 1962 war and 1971 war were impeccable. He was honored with Mahavir Chakra for the same.

March 30, 2020

NASA ANNOUNCES SUNRISE MISSION

NASA announced Sun Radio Interferometer Space Experiment (SunRISE) mission. The mission is to study about how sun creates Giant Solar Particle Storms. The SunRISE mission will provide information on how the Sun's radiation affects the space environment and to understand the working of the solar system. The study will also aid future astronauts mission.

March 30, 2020

RAJASTHAN STATEHOOD DAY

Rajasthan celebrates its Statehood Day on March 30 every year.
Popularly known as "Land of the Kings", the day is also called "Rajasthan Day". This year, the state was silent due to the lock down in the country. Usually there were radiant and invigorating events held all across

April 7, 2020

WORLD HEALTH DAY

April 7 is marked as the World Health Day every year. The day is marked to celebrate the work of midwives and nurses for their role in keeping the world safety and healthy. This year, 2020, has celebrated as International Year of Nurses andMidwives. The World Health Day is marked by World Health Organization along with several other organizations. The theme of the World Health Day is selected by WHO. Theme of 2020: Support Nurses and Midwives.

APRIL 9, 2020

INDIAN RAILWAY AGAINST COVID 19

Apart from converting its coaches into hospital beds, the Indian Railways has also launched isolation wards. Around 3,250 coaches have been converted into isolation wards. It has recruited 2,500 temporary doctors and 35,000 paramedic staffs. Around 5,000 beds have been identified for treatment in railway hospitals.

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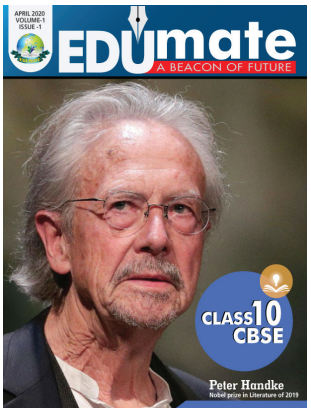

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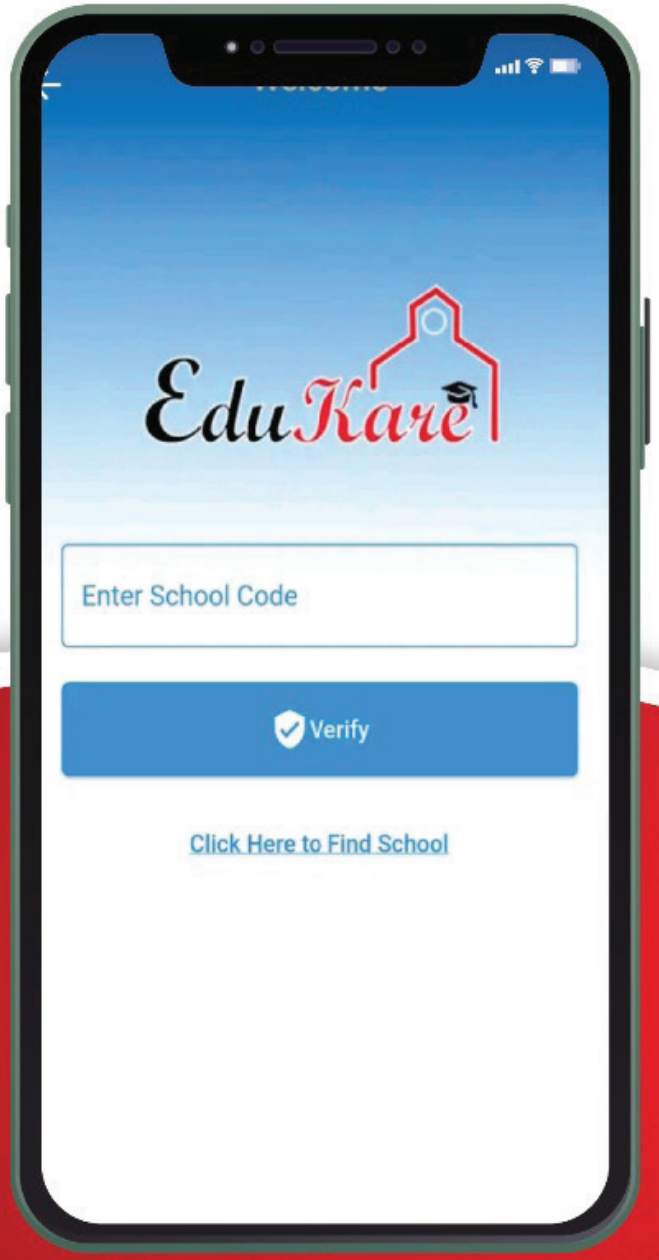

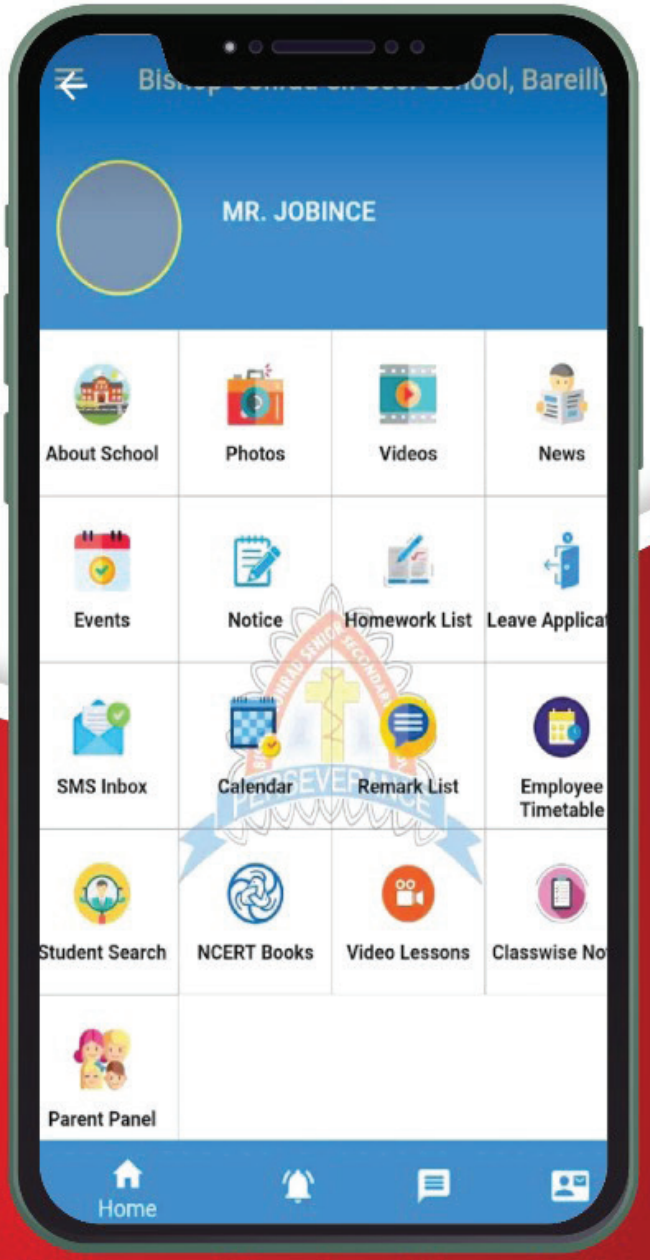

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