

SUBJECT: ENGLISH

Prose 07

The Merchant of Venice

Adapted and Abridge from Charles Lamb's "Tales from Shakespeare"

Q1. Why does Shylock hate Antonio?

Ans. Shylock hates Antonio intensely over his anti-Judaism nature and his customary lending money gratis to the people in distress. Besides, Antonio reproaches Shylock on his hard hearted usury as he lends money to Christian merchants at high rate of interest and exerts pressure on them for the repayment of lent money.

Q2. How does Antonio help Bassanio?

Ans. Bassanio, a friend of Antonio, has to depart to Belmont to woo a beautiful and opulent heiress, Portia. But, he has no money to subsidize his expenses of an eligible suitor like others. So, he asks Antonio to lend him Three Thousand ducats for the very purpose. Since Antonio is also cash-poor as he has invested all his money in trade. But, being very eager to facilitate the required money for Bassanio, he borrows the sum from an old Jewish and enemy usurer, Shylock, upon a strange and dreadful bond. Thus, Antonio helps Bassanio who sets out for Belmont with high hopes of winning the beautiful Portia as his spouse.

Q3. How does Shylock feel when Antonio asks for some money? Why is he interested to pay the required sum?

Ans. Shylock, an old foe of Antonio, has been waiting for the chance to take revenge on Antonio. But, when Antonio asks him for the loan of Three Thousand ducats, Shylock feels dazed and begins to muse inwardly over the unexpected situation. Shylock is much desired to lend the needed sum to his enemy, Antonio because he wants to feed fat the ancient grudge that he has tolerated for a long time. As he is being disdained and criticized on his custom of lending money, he wants to take revenge on Antonio by making him sign a risky bond that may take his life off.

Q4. What condition does Shylock put forth if the debt is not paid in time?

Ans. The Condition that Shylock puts before Antonio is that, if the debt is not repaid within a specified date, he may have right to forfeit a pound of flesh from any part of his body that Shylock pleases.

Q5. How does Bassanio marry Portia?

Ans. In the case of Portia's marriage, her father sets a will stipulation for each suitor in which each suitor must choose a right casket from among the three --- gold, silver and lead to win Portia's hand. All have failed except Bassanio in choosing the right casket, as they are misled by the splendid appearance of gold and silver caskets. Bassanio, on his turn, ponders over his choice and finally chooses the lead casket that makes him eligible to marry Portia. Portia herself intends to marry Bassanio as she has fallen in love with him at the very first sight and finally a day for marriage is fixed.

Q6. Why is the case brought before the Duke of Venice?

Ans. The case is brought before the Duke of Venice because Shylock ignores several pleas to spare Antonio's life who has failed to repay the Jew's debt in time. Shylock files a suit against Antonio claiming the penalty of a pound of flesh. Thus, a trial is called to decide the matter.

Q7. Who is disguised as the learned counselor (Doctor Balthazar)? Why has he come to the court of Venice?

Ans. Portia is disguised as the learned counsel or Doctor Balthasar. Portia in the disguise of Balthazar has come to the court of Venice to plead for the acquittal of her husband's intimate friend Antonio, who has been trapped in a nasty situation by his adversary, Shylock.

Q8. How did the Counselor start his argument and how was he able to get the judgment in Antonio's favour?

Ans. The disguised counselor, Portia, began her argument in favour of Shylock, by claiming that Shylock indeed has a right to Antonio's pound of flesh. But in an invigorating speech, she appealed Shylock to display mercy to Antonio. However, Shylock adamantly denied any compensation except, a pound of flesh that was due to him according to the bond. Thus, Antonio should prepare his bosom for Shylock's knife. But, as Shylock was on the verge of collecting his due, Portia reminded him that he must do so without causing Antonio to bleed, as the bond didn't entitle him to any blood. Further damning Shylock's case, she informed Shylock that he was guilty of conspiring against the life of a Venetian citizen and he must turn half of his property to the state and the other half to Antonio. The king, who was happy at the way things have gone, was ready to spare Shylock's life and even allowed him to keep a part of his property, but he would have to give half of it to Antonio. The generous Antonio, however instead of taking the money himself, suggested that it should be given to Shylock's daughter who had married a Christian against her father's will. Thus, the counselor won the case and was able to get the judgment in Antonio's favour.

Q9. How does Portia get back her ring?

Ans. After winning the case, Bassanio offers Portia to accept any valuable gift, to be given on the celebration of her win. At first, she refuses to accept any, but at his insistence, she asks for the ring to Portia as he has promised to his wife Portia never to part with the ring in any situation. But after the intense persuasion of Antonio, Bassanio unwillingly gives the ring to Portia. In this way, Portia gets back her ring which she has given to Bassanio.

Q10. Describe the theme/s of the play.

Ans. 'The Merchant of Venice' is a tragicomedy alleged to have been written between 1596 and 1598 by William Shakespeare. It is notable for its dramatic scenes and is best known for Shylock and the famous 'Hath not a Jew eyes' speech. The play is highly dominated by the major themes of love, hatred and mercy including sub themes like anti-Semitism, salvation and generosity.

All the themes trigger successively as the play proceeds towards climax. At the beginning, we encounter the antagonist of the play, Shylock who is the main source for its prevalent themes. Shylock, a professional usurer has been intensively abhorred by all good men of Venice, particularly by Antonio, a generous money lender, for his custom of lending money to Christian merchants on high interests. This atrocious business of the covetous Shylock and on contrast of it, Antonio's nature of generosity gives birth to a great enmity between the two. So, whenever they meet intermittently, even at Rialto, Antonio often reproaches and rails at him for his hard hearted usury.

Love is another prominent theme of the play which elucidates the profound friendship between Antonio and Bassanio and a passionate love affair between Bassanio and Portia. The themes of the play are inextricably interwoven. Antonio borrows required sum from his old adversary to fulfill Bassanio's desire of marriage with his lover, Portia, at the cost of his own life. Shylock gives affirmative response on lending money to Antonio but only on a dreadful condition that, if Antonio fails to repay lent money within the specified date, Shylock may forfeit a pound of flesh from his body. When Antonio fails to repay the borrowed money; he is led to the court by Shylock to fulfill the bond. In the meantime, Portia, a disguised counselor, appeals Shylock to show mercy at Antonio and not to claim for the awful penalty. There upon, Shylock denies any kind of compensation except a pound of flesh. At the end, the wise Portia skillfully turns the case in Antonio's favour and in turn traps Shylock on the case of conspiracy against a Christian and Venetian citizen. Against all the odds, Portia succeeds in transmitting the proceedings away from violence and towards forgiveness. Therefore, all the themes of the play go together to make this play a remarkable one.

Character sketch of Shylock

Shylock, an antagonist of the play 'The Merchant of Venice' was a usurer by profession. He had amassed an immense fortune by lending money at high interest to Christian merchants. He was much hated by all good men of Venice and particularly by Antonio as he exerted pressure on people for the repayment of money he lent. Shylock was strongly revengeful against Antonio as he was often being railed and reproached by him for his obnoxious (hateful) business standard. He was excessively eager for the moment when Antonio would be an easy prey to him. But that opportunity came very late to him when Antonio was in dire need of money to support his friend, Bassanio, for winning Portia.

The cruel Shylock agreed to lend money to Antonio only on a dreadful bond that Antonio had to sign. The bond demanded a pound of flesh that might be forfeited from Antonio's body if he would fail to repay the lent money within the specified period. As Shylock was very close to succeed in his plan, the fate, in turn fell on him with a heavy blow. He was completely defeated by a disguised counselor, who pointed out a wise discovery, that it was flesh and not blood that was named in the bond, which saved Antonio's life. In addition to that, she charged Shylock on the case of conspiracy against a Christian and Venetian citizen and for that his whole property would be confiscated. Finally, Shylock was saved and was allowed to keep a part of his property on the suggestion of Antonio. Shylock was a moral less and pitiless character in the play. Certainly, who digs pit for others, he himself falls into it. So, same happened with Shylock as he was spiteful and treacherous in nature.

Prose08:

The Ghat Of The Only World --- Amitav Ghosh

Thinking about the text

Q1. What were the common things between Ghosh and Shahid?

Ans. Amitav Ghosh and Agha Shahid Ali belonged to different religions and backgrounds but they had a huge roster of common things. Both of these wonderful persons studied in Delhi University which somehow helped them in getting close to each other. They had common friends in India, America and elsewhere. They had a friendly approach and loved to make friends. Both of them loved Rogan Josh, a traditional Kashmiri dish. They had a common liking of Roshan Ara Begum, Kishore Kumar, Old Bombay films and songs. But both of them had a natural indifference towards the sport of cricket. Both of these friends were enthusiastic, humorous and interesting.

Q2. What are the things that Shahid loved?

Ans. Shahid loved many things in his life. He was fond of good food like Rogan Josh; a traditional Kashmiri dish. He had a friendly approach and loved to make friends. He also loved the spirit of festivity. There was never an evening when there wasn't a party in the living room. He liked Kishore Kumar and Roshan Ara Begum. He always loved to watch old Bombay films but was indifferent towards the sport of cricket. All these things indicate that he didn't have time to be depressed.

Q3. How does Shahid Ali face death? Describe the hospital scene?

Ans. Agha Shahid Ali was suffering from brain tumor that was revealed in February 2000. Though he knew that death would knock his door anytime, he continued to be gregarious, courageous and full of wit.

On May 21 Shahid underwent a surgical procedure. His head was shaved and the shape of the tumor was visible depicting his serious illness. When it was time for him to leave the hospital, he was not even slightly tense. When the hospital escort brought the wheelchair to carry him, he refused to use it as he was armed with a struggling zeal. He readily declared that he was strong enough to walk out of the hospital on his own. But unfortunately, his knees stumbled after some steps, indicating that he was now weak nearing his death. He was helped by his companions in facing this tough time. In spite of his weakness, he still had a brilliant smile on his face. All these clearly depicted that although he was seriously ill and he knew the fact very well that death would take him up in its arms at any point of time but still he faced all the hurdles put forth by his luck without a single trace of despair. He just enjoyed every moment of his life and faced his approaching death with high spirits.

Q4. Who is James Merrill?

Ans. James Merrill is an famous American poet who radically changed the direction of Shahid's poetry writing. It is because of his meet in Arizona that Shahid starts experimenting with strict metrical patterns and verse forms. In one of his poems Shahid has tributed Merrill by using his name in a verse which is:

“Shahid, Hush! This is me, James, the loved one always leave. This poem is actually a forecast of Shahid's death written by Shahid himself. In this poem he wishes to meet his beloved ones in the life hereafter and James Merrill; his favourite poet, is one of them.

Q5. Pick out the elements of humour from the lesson.

Ans. The elements of humour from the lesson 'The Ghat of the Only World' is:-

Shahid was very gregarious. His house would be usually filled with family, friends and contemporaries. On one occasion, some people arrived with a television camera. Instead of being upset, he just got excited and said, "I am so shameless; I just love the camera".

Once at Barcelona airport, Aga Shahid was stopped by a security guard just as he was about to board a plane. He was asked by the guard; a woman what he had been doing in Spain. "Writing Poetry", he said. When the same woman asked him if he was carrying anything dangerous for other passengers, Shahid pointed to his heart and cried, "Only my heart".

Q6. What facilitated Ghosh to fulfill his pledge? How did it help him?

Ans. Shahid wanted to be remembered all over the world right after his death. One day, on a telephonic conversation, Shahid talked to Amitav Ghosh about his death. He entrusted him with a great responsibility that he was to write his biography so that people do not remember him by repetitive memories but by written words. Amitav Ghosh thought of making excuses but Shahid made his friend to accept it and thus Ghosh decided to write about his friend. In order to fulfill his pledge, Ghosh started keeping records of everything that he shared with Shahid. He noted everything about Shahid's life and wrote about all the meetings he had with him. His close association with him gave him a detailed knowledge about his life.

It helped him to make his dead friend alive forever. It also made him aware of inspiring personality of his friend. He studied his professional life, poetic life and life as a citizen of a disputed region Kashmir.

Q7. What was Shahid's reputation as a teacher among the students?

Ans. Shahid was a brilliant teacher who worked in different colleges and universities. It was because of his brilliance, intelligence and art of teaching that he had gained a good reputation among his students. They adored him and held him in deep love and respect. The students of Manhattan's Baruch College printed a magazine and dedicated this issue to him when he left the college. He made his class lively because of his laughter, style and glamour. He appreciated his students particularly those from Indian subcontinent because their presence created a patriotic feeling in him.

Q8. What does "The Ghat of the Only World" mean?

Ans. "The Ghat of The Only World" is actually the title of Shahid's famous poem in the collection of his poems, "Rooms Are Never Finished". Shahid has forecasted his own death in this poem. He feels that he is sitting on the bank of a river waiting for death which would take him to another ghat where his beloved ones are waiting for him. Thus, "The Ghat of the Only World" means the ending phase of life in this world from where he would start his journey to hereafter.

Poem08:

The Tale Of Custard The Dragon --- Ogden Nash

Summary:

The poem, "The Tale of Custard the Dragon", is a ballad composed by an American poet, Frederick Ogden Nash (August 19, 1902 - May 19, 1971). In this poem, the poet wants to tell us about those people who, are looked down upon by others for being lazy and coward and claim of no bravery, sometimes turn out to be brave and courageous when the occasion demands it.

There lives a girl Belinda in a little white house who has four little pets --- a black kitten (Ink), a grey mouse (Blink), a yellow dog (Mustard) and a dragon (Custard). All, except Custard, praise of their bravery and claim to be brave and courageous. Custard; the dragon has big sharp teeth. He has spikes on his top and scales underneath. His mouth is like a fire place and his nose is like a chimney. Though he appears to be ferocious, yet he always prays for a nice safe cage.

It is thought that Belinda tickles Custard mercilessly, while Ink, Blink and Mustard make fun of him and call him coward. He is neglected while the others are given proper care. One day, a pirate breaks into Belinda's house with a pistol in his each hand and a sharp little sword in his mouth. The pirate has a black beard with a ferocious look and he has not come with a good intention. Ink, Blink and

Mustard run away in fear and hide themselves. But it is Custard, who faces the pirate bravely and courageously and kills him.

Finding herself free from the danger, Belinda embraces Custard and the other three begin to dance in joy around him. Then, Ink, Blink and Mustard start claiming that they would have been twice and thrice braver than Custard if they weren't confused and were given opportunity. Very soon they again start claiming of their bravery in their usual way while Custard again prays for a safe cage. It is a lesson for us from the poem that instead of boasting, one should do something worth valuable like a heroic deed.

Thinking about the poem

Q1. Who are the characters in this poem? List them with their pet names?

Ans. Apart from Belinda; a girl, there are four other characters in this poem, which are :

- | | |
|---------------------------|---------|
| A) A little black kitten. | Ink |
| B) A grey mouse. | Blink |
| C) A yellow dog. | Mustard |
| D) A dragon. | Custard |

Q2. Why did Custard cry for a nice safe cage?

Ans. Custard cried for a nice safe cage because it was thought to be a coward and a fearful dragon.

Q3. Why the dragon is called a cowardly dragon?

Ans. The dragon is called cowardly dragon because it lacks courage and always cries for a nice safe cage for its safety and protection.

Q4. "Belinda tickled him, she tickled him unmerciful", Why?

Ans. Belinda tickled the dragon unmercifully because she thought it to be coward and lazy.

Q5. Do you find "The Tale of Custard the Dragon" a serious or funny poem? Give reasons in support of your answer.

Ans. "The Tale of Custard the Dragon" is a light-hearted poem which amuses the readers. It tells us a very interesting story of Custard ; the Dragon ; who is teased for being coward but who later proves brave and turns out to be courageous by saving the life of those who use to look down upon him. The words like realio, trulio, winda etc also amuse and entertain us. The poem has all the elements which make it funny and humorous.

Learning about the Literary Devices

Q1. What is the rhyme scheme of the poem?

Ans. The rhyme scheme of the poem is 'aabb' which means the first line of each stanza rhymes with its second line and the third line of each stanza rhymes with its third line.

Q2. Pick out the lines from the poem which contain similes.

Ans. The lines from the poem which contain similes are:-

1. And the little dog was sharp as Mustard.
2. Belinda was as brave as a barrel full of bears
3. Mustard was as brave as a tiger in a rage
4. Mouth like a fireplace
5. But jumped up Custard, snorting like an engine.
6. Clashed his tail like iron in a dungeon.
7. He charged at the pirate like a robin at a worm.

Q3. What images does the poet use in the poem?

Ans. The images used by the poet in the poem are:-

1. Mouth like a fireplace
2. Chimney for a nose
3. Daggers on Custard's toes
4. As brave as a barrel full of bears
5. As brave as a tiger in rage

6. Snorting like an engine
7. Clashing his tails like irons in a dungeon
8. Ink and Blink in glee did gyrate
9. He charged at the pirate like a robin at a worm

Q4. Which line/stanza is used as a refrain in the poem?

Ans. Refrain means repetition of the lines in a song or poem, especially at the end of each verse. Here in this poem, the last stanza / quatrain has been used as a refrain.

Poem09:

Last Lesson Of The Afternoon --- D. H. Lawrence

Summary:

The poem entitled, "Last Lesson Of The Afternoon" has been authored by 'D.H Lawrence'. The poet depicts the desperation of a teacher who is fed up with his students and considers his teaching and their learning purposeless. The opening lines of the poem present a picture that a teacher is tired and thus feels wearisome and boredom in his class. The teacher is making vain efforts of teaching his students. The speaker of the poem i.e. the teacher compares his students to uncontrollable and lawless hounds, who want to break apart the strap holding them. They want to be free from the burden of studies. So, the teacher has given up the attempt to give them knowledge and feels that he cannot pull or drag them towards knowledge which is against their will.

Further, the poet says that the teacher is unable to tolerate the checking of their untidy notebooks which are sixty in number. So, the teacher concludes that teaching the disinterested students and checking the notebooks of these sixty chaps is terrifying for him.

In the third stanza, the poet depicts a changed tone of the teacher. He tries to build a hope to teach his students. He wishes to gather his energy and give them best knowledge which would end their laziness and boredom and divert their attention towards their studies. He compares this hope to a flame in which he wants to cast down weariness of his students. He wants to punish his students for all the insults they had done to their teacher.

But, later he quickly changes his mind and decides not to waste his energy and knowledge. He feels that he should be uncared about his undisciplined students. He feels his efforts of teaching them and their learning purposeless. He is totally fed up with his professional life and feels that it doesn't matter for him whether they are educated enough to write a simple description about a dog. He doesn't care about their education at all. But he is aware of the fact that despite of his unwillingness to stay in the class, he has to take care of them and control them.

The last stanza reveals the utter disinterest and carelessness of the teacher. The teacher is determined not to waste his strength in teaching the students because he knows that they won't agree to listen to him. So, he decides not to attempt impossible thing and feels it better on his part to sit and wait for the bell to ring.

Thinking about the poem

Q1. What is the tone in the opening line of the poem?

Ans. The opening line of the poem depicts boredom and weariness. It is the tone of bitter desperation and the thanklessness of the poet who in this poem happens to be a teacher.

Q2. Who is the speaker of the poem?

Ans. The speaker of the poem is a teacher.

Q3. What are the pupils regarded as?

Ans. The pupils are regarded as 'unruly hounds'. The teacher has failed to 'haul them and urge them' because the students are not interested in learning. They keep tugging the leash and want to break apart the shackles of school rules and studies.

Q4. Which words and phrases in stanza 2 convey the mood of the speaker?

Ans. The words which convey the mood of the speaker are:

1. Endure
2. Brunt



The phrases that convey the mood of the speaker are:

1. Can I endure the brunt?
2. I am sick.
3. What on Earth is the good of it all?
4. What good to them or me, I cannot see.

Q5. Why doesn't the speaker want to consume his fuel anymore?

Ans. By 'fuel' in the poem, the speaker means his energy. The speaker doesn't want to consume his fuel anymore because even after his utmost efforts, he has failed to motivate the students to gain knowledge. So, he decides to preserve his precious energy and is determined not to waste on the disobedient students.

Q6. What do you think, 'Take the toll of their insults in punishments'?

Ans. 'Take the toll of their insults in punishments' is a figurative language which means that the teacher is completely fed up with his students. He has intolaterated many indisciplined activities and insults of his students. The teacher wants to melt their disinterest and wants to compensate all their insults with severe punishments.

Q7. Why does the teacher feel that his teaching and pupils' learning both are purposeless? Pick out the words and phrases which show that he share his pupils' indifference to their work.

Ans. The teacher feels that his teaching and the pupils' learning are both purposeless because inspite of his best efforts to teach them, he has totally failed to get any positive response from them. He finds that his students are not interested in learning. So, he too loses his interest in teaching them.

The words and phrases which show that the teacher shares his pupils' indifference to their work are:

1. I will not waste my soul and my strength.
2. What is the point of teaching of mine and of this learning of theirs?
3. It is all my aunt.
4. It all goes down the same abyss.
5. Beat our heads against the wall.
6. I do not and will not, they won't and they don't.

Q8. Do you find any connection between the beginning and the ending of the poem?

Ans. Yes, there is much connection between the beginning and the ending of the poem. In both cases, we find the teacher's weariness and reluctance to stay in the class and teach the students. In the beginning of the poem the teacher is shown as a pessimist who doesn't want to teach his disinterested students as they don't show any positive response towards his teaching. But in the middle of the poem, the teacher becomes optimistic and wants to utilize his energy to teach them. When he still gets negative response from his students, he becomes pessimistic again at the end of the poem and waits for the last bell to ring in order to get rid of such disinterested, rude and indisplined students.

Q9. After reading the poem, write an account of your opinion /idea in 100-200 words about the poem.

Ans. The poem, 'Last Lesson of the Afternoon' expresses a mood of bitter desperation at the thanklessness of teacher's work. It is a fact that teaching is not a one-way affair. We can send a student to school but we cannot make him learn as per his individual will and wish. A student can learn only if he wants to learn. The teacher, in the poem is tired of his rude, indisciplined and dull students and he is waiting for the last bell to ring in order to get rid of such students. He decides to keep his energy for himself rather than inspiring them to gain education. It seems that the teacher is of pessimistic approach. He has developed his own theory that he will not teach as his students will not obey and listen to his teachings. In order to make teaching-learning process successful, students should be motivated and inspired at the first priority with a desire to learn. Even if a teacher fails to make his students learn, he should not lose his heart but should try his best to work on his students and it is obvious that hard work never goes waste.

Learning about the Literary Devices

Q1.What is the metaphor used by the poet in stanza 1?

Ans. The metaphor used by the poet in stanza 1 is 'My pack of 'unruly hounds'. It is used to depict his

(the teacher's) indisciplined and uncontrollable students.

Q2. Identify the metaphor in stanza 3.

The metaphor used in stanza 3 is 'My last dear fuel of life'. It is used to depict the energy or knowledge of a teacher.

Poem10:

From "I Explain A Few Things"--- Pablo Neruda

Central Idea:

War and peace are two phases which determine the fate of a particular country. War leaves a prosperous nation destructed and devastated. On the contrary, peace increases the prosperity of a country. War ruins the beauty of a nation and affects the talented personalities of the nation. The aftermaths of the war are depression, devastation and misery.

Summary:

The poem, "From I Explain A Few Things", is composed by 'Pablo Neruda'. The poem is a lamentation on Spanish Civil War in which the noted poets, Federico Garcia Lorca and Rafael Albert were killed. The poet describes his journey from happiness to agony. He describes the pre-war and post-war conditions of his motherland. The poet describes despair, devastation, tyranny and damages through the symbols of Jackals, bandits, stones, vipers, fire, blood and bullets. The poem is an emotional account of the transference of a prosperous and beautiful nation into a ruined and destructed place through the words of a patriotic poet.

In the beginning of the poem, the poet describes his motherland in a very elegant way. He says that he lived in a small house in the capital of Spain i.e. Madrid. His native place was full of church bells for priests and worshippers; clock towers, which kept people updated about their business and office works. It also had lush green trees and herbage to refresh the air all around. From his house, he could see the beautiful place of Castille surrounded by the ocean full of enormous aquatic life which decided their economy. His house and his country was named 'The house of Flowers' as it was full of beautiful Geraniums. The houses with little dogs and little children made the country even more prettier. The poet calls upon the famous poets of Spain, Rafael Albert and Federico Garcia Lorca to corroborate the fact that his country was very beautiful and peaceful. He wants his dead friends to recapitulate the beautiful month of June which inspired them to write the beautiful poetry. He makes his buried friends remember the cold weather when the slow winds moved the weather vanes. He tells them about the enormous production of various crops like potatoes and tomatoes. Thus he gives a beautiful picture of prosperous and marvelous Spain.

In the next half of the poem the poet describes the advent of Spanish Civil War and the situation after. The poet says that one morning everything changed. The civil war burnt everything. It approached as of various dazzling fires leapt out of the earth and engulfed the beauty and prosperity of Spain. The poet says that every creature became a victim of this war. The fire of destruction came from the earth and sky and massacred and slaughtered the youth. The streets and the soil of Spain became full of the blood of children.

In the next stanza, the poet uses symbolism to depict the traitors and bureaucrats of Spain, who took an active part in igniting the war. The poet uses various disgusting images to describe these people. He describes them as Jackals which would be hated by the cunning Jackals. He says that even the determined and patriotic people, who were very firm, joined the war on the motivation of trivial and mischievous people. He describes them as vipers which spread the venom of slaughter and hatred among the people.

The poet tells his friends that they were lucky to die before seeing the heart rendering conditions of Spain. The poet says that unlike his friends, he has been a witness to the damage of Spain. He says that he has seen the blood of youth rising like a wave and thus killing many patriots. The poet says that this wave of prestige, power and brutal killings initiated by the army Generals, traitors and treacherous people, engulfed the children, youngsters and talented people of Spain.

The poet further asks his friends to think about his dead house i.e. Spain, full of killings and moaning. He says that every house now presents a picture of grief and laments instead of flowers and beauty. The poet then gives a hope of glorification of Spain. He addresses the black sheep community of Spain and warns them that the Spanish youth will take revenge of their atrocities and oppressions. He

tells them that in response of their atrocities and tyrannies, they will face the rebellions of future generation. The poet then tells his friends that they will ask about the images of Spanish beauties in his poetry. He further says that his poetry is without the concept of beautiful Spain because he can see blood through the streets. He says that he has seen enormous bloodshed and war, as a result of which, his poetry is full of lamentations. These incidents have concealed the concept of dreams and beauty in his poems and emotional verses of martyrdom and tolerance have taken their place.

Thinking about the poem

Q1. Why does the poet use the title, 'From I Explain A Few Things'?

Ans. The poet uses the title, "From I Explain The Few Things" because the destruction of Spain is unlimited and he is unable to cover it all in his poetry. So, he tries to explain few things so that his friends and other people come to know about the situation faced by Spain.

OR

The poet, Pablo Neruda, used to compare poems about the beauties of nature and the sweet dreams of his homeland town, Madrid, but there broke out a Civil War that destroyed everything. There was blood everywhere in the streets of Madrid, the blood of children that rent his heart. He was no longer able to write poems about the beauties of nature and the dreams of his homeland. So he uses the title, 'I Explain A Few Things' for his poem in which he describes the terrible scene of bloodshed during the Spanish Civil War and explains the reason behind his change of mind.

Q2. What are the memories that the poet talks about in the poem?

Ans. The memories that the poet talks in the poem are both pleasant and agonized. The poet talks about the pleasant memories when his homeland used to be prosperous and charming. It was the town that symbolized prosperity, beauty and a promising future. The Church bells, the Clocks on the top of tall buildings and a large area of land covered with green trees were the main features of the capital. Life was very busy. People hustling and bustling around could be seen all the time. The house where the poet lived was called 'The House of Flowers'. It was a beautiful house with dogs and little children. The town was surrounded with rich natural beauty.

The poet also talks about the emotional and painful memories after witnessing the devastation of his nation due to The Civil War. He remembers the merciless slaughter of the youngsters and the blood gushing out from every street. He remembers the ruin and rout of his beloved nation which makes his heart ache.

Q3. What happened later and why?

Ans. There was a terrible massacre that destroyed Madrid City completely. One morning, a large fire leapt from the earth that engulfed everything --- men, animals, crops, flowers, buildings etc. Millions of people were killed in the war. There was destruction all around and all works of art, beauties of nature, public and private properties were damaged. Some of the poet's friends like Garcia Lorca and Rafael Albert were also killed mercilessly that left an intensive pain in the poet's heart. The damage was done with the support, blessings and approval of duchesses and friars.

Q4. Why doesn't the poet write the poetry of sweet dreams ?

Ans. The poet is handicapped to write the poetry of sweet dreams because his heart and mind is filled with lamentation and agony for his dead countrymen. He can see the bloodshed and heart renting scenes of death and disaster all around him. These incidents have concealed the concept of dreams and beauty in his poems and emotional verses of martyrdom and tolerance have taken their place.

Q5. Explain the lines:

My house was named

The house of flowers..... moment blood

Ans. In these verses of the poem, the poet is making the readers to develop a contrast between the pre-war and post-war conditions of Spain. 'The house' can be a symbolism for his beloved country. He considers his nation before the war as "the house of flowers". The poet says that his country was full of heart-throbbing and splendid sights. Through every crack, a flower would bloom signifying the peaceful and beautiful atmosphere of his country. He says that every house used to be jubilant and kept pets for their amusement. He then addresses to his dead friends who had been the victims of the war. He talks to them about the beautiful months of June and winter when they would be inspired to

write beautiful poetry. He describes the surplus production of crops which his country had before the war. Then, one day everything started to get destroyed. The poet says that everything was engulfed

by the fire which appeared to evolve out of the earth and the sky. The fire of killings affected everyone and triggered a continuous series of merciless bloodshed.

Q6. How had the Civil War affected Spain?

Ans. The Civil War has completely destroyed Spain that symbolized prosperity, beauty and a promising future before the war. It has changed Spain from being a land of flowers to a land of dead bodies and broken houses. All works of art, beauties of nature, public and private property has been destroyed. Spain's coming generation, the children have been killed mercilessly and also the noted Spanish poets have been assassinated. There is blood everywhere in the streets of Spain which is the blood of Spain's posterity.

Q7. Explain the journey of the poet from happiness to agony?

Ans. The poet has come through a struggling phase from happiness to agony. Initially the poet has dwelled in a peaceful country with picturesque scenes and prosperous economy. He has seen every beautiful aspect of his beloved nation. And as the time sprints by, everything changes. He sustains in the Civil War when all his friends die in the same. He becomes the unlucky fellow to observe the breakdown of his country's social, political and economic machinery. He witnesses the scenes of tyrannical killings and atrocities done to his fellow countrymen. He also witnesses the agonized scenes of his motherland being covered with innocent blood of the youth rather than beautiful cover of greenery and flowers.

Q8. What is the mood of the poet in the poem? How do you feel after reading the poem?

Ans. In the opening lines of the poem, the poet feels very happy and his life is full of enthusiasm because everything looks pleasant and attractive. There isn't any sign of pain or sadness on his face and in his heart as well. But when the Civil War breaks out in Spain, it changed it (Spain) from a land of flowers to a land of dead bodies and broken houses. All around, there is destruction and devastation and the poet's heart is filled with pain. He feels very sorry and regrets for the damage done by the wicked and treacherous people. The poem is actually an elegy on Spanish Civil War in which the poet expresses grief and sadness and regrets for the noted Spanish poets, Garcia Lorca and Rafael Albert, being killed in the war.

After going through the poem, we feel that Wars are a curse for humanity. War leaves prosperous nation devastated and ruined. Wars hinder the prosperity of the nation and make the youth its prior target. Humans should pledge to resolve the disputes by mutual agreement rather than through terrible wars.

Learning about the Literary Devices

Q1. Pick out at least two symbols used by the poet in the poem. Who do they symbolize?

Ans. The two symbols used by the poet in the poem are: Jackals and Vipers.

Jackals symbolize the cunning and disloyal people of the country who are responsible for the killing of youngsters for their personal gains.

Vipers symbolize the traitors and treacherous people who appear to be humans but are filled with poison against their fellow citizens.

OR

The symbols used by the poet in the poem are: Jackals, stones, Vipers, fire, blood and bullets. These symbolize despair, destruction, devastation, tyranny and vandalism.

Q2. Pick out the images used by the poet to describe peace and war in the poem.

The images used to describe peace by the poet in the poem are:

1. Church bells, clocks, trees.
2. The house of flowers.
3. Geraniums exploded.
4. A beautiful house with dogs and little children.
5. The light of June drowned flowers in your mouth
6. The fine, frenzied ivory of potatoes.

7. Tomatoes multiplied down to the sea.

The images describing war are:

1. Bonfires leapt from the earth devouring human beings.
2. Gun powder from that moment and from that moment blood
3. Things with signet rings, planes, Moors and duchesses
4. Blood of Spain rise up
5. Vipers ,Jackals
6. The blood through the streets.

Short-Story06:

Dusk Saki

Thinking about the text

Q1. What was the atmosphere at the Hyde Park?

Ans. The whole atmosphere at the Hyde Park was full of sadness (dusky). It was an early March evening at around 6:30 and the dusk had fallen heavily over the scene. Though there was a wide emptiness over road and sidewalk ,yet some people were moving here and there while others were sitting on the benches and chairs in the park. Their faces were scarcely distinguished from the shadowed gloom in which they sat. According to Gortsby, it was the time of dejected and disappointed people, who would come to such places to enjoy their solitariness.

Q2. Do the atmosphere and mood at the park justify the title of the story as “Dusk”?

Ans. The title of the story, ”Dusk” describes the atmosphere of twilight. It is half past six in the evening and the dusk has fallen heavily over the scene. The atmosphere alone is not dark, gloomy and dusky; the people, who have come to the park at this time of the day, also seem to be depressed and defeated by the struggles of time. It appears as if the people have lost success and vitality in their lives. These people want to remain unnoticed from other people of the world and they want to reflect and mediate about their defeated life inspite of the unparalleled efforts to succeed it. The author has used the term 'bat fashion', to describe these people because they hide their identity due to the fear of criticism and accusation and thus come out in the dusk to soothe their discontented feelings towards their lives. Thus the whole atmosphere and mood of the park undoubtedly justify the title of the story.

Q3. Draw a profile of the person who sat near Gortsby on the bench.

Ans. The person who sat beside Gortsby on the bench at the Hyde Park was an impoverished elderly gentleman who looked dejected and despondent. He was in tattered clothes and his face had the expressions of loneliness, helplessness and hidden anger. It seemed that nobody cared about him probably because he was in the dusk of his life. His presence heightened all the prevailing gloom and atmosphere of the park.

Q4. What, according to Gortsby, was the weak point of the Youngman’s story?

Ans. The Youngman who sat beside Gortsby was a newcomer in the city. He had gone out of the hotel to buy a cake of soap . He had been walking leisurely in search of the soap and had not kept any record of the distance he had travelled from the hotel. After buying the soap, he had entered a pub to have a drink. He had only a shilling in his pocket which he spent on buying the soap and having some drink for himself. But when he had intended to return to his hotel, he had realized that he neither remembered the way nor the name and address of the hotel he was staying in. Gortsby believed this story of Youngman because he himself had faced a similar fate along with a friend in a foreign capital. He didn't completely discard it but in order to convince himself about the reality of his story, he asked the Youngman to produce the soap which he had bought. To his surprise, the Youngman was unable to produce the soap and he pretended to have lost it. Gortsby identified it as a weak point of his story and considered the intentional creation of the youngster to fool others and to money out of sympathy.

Q5. While walking back to his seat in the park, what did Gortsby see?

Ans. While walking back to his seat in the park, Gortsby saw the same old man, who was sitting beside him in the bench that March evening. He saw the old man poking and peering under the bench

as if he had been looking for something. He asked the old man if he had been looking for something. The old man replied that he had lost the soap which he had bought before.

Q6. How did Norman Gortsby feel when he realized that he had been fooled?

Ans. Norman Gortsby was very clever and alert. The story narrated by the Youngman didn't convince him and he quickly inferred it to be an emotional drama. He could even decipher various weak points in the Youngman's story but still the youngster succeeded in befooling him. He convinced him in a very impressed and believable manner. Gortsby was very emotional when he saw the soap under the bench and quickly condemned himself for suspecting the Youngman. He went from pillar to the post to find the Youngman and gave him the cake of soap. He also gave him a sovereign as a mark of gratitude and sympathy. And finally when he came to know of the real thing, he could do nothing but beat his head and laugh at himself.

Q7. What did Gortsby imagine about the people who visited the Hyde Park?

Ans. Gortsby had a different perception about the people who visited the Hyde Park in the evening. He believed that the people who had come to the park at that time of the day had reached the dusk of their lives. Their fortunes had fallen and their hopes were dead. It was reflected from their shabby clothes, bowed shoulders, withered faces and unhappy eyes. Dusk, for Gortsby was the hour of the defeated. Moreover, the silence and the gloom of the atmosphere harmonized with their feelings. He also compared them with bats that steal away from daylight and appear only in the dark. These people also avoided meeting the people due to their defeated life.

Q8. What is irony? Bring out the elements of irony in the story?

Ans. Irony is a figure of speech in which a musing or strange aspect of a situation is very different from what is expected. In the present story, Saki has used this literary technique a couple of times. At first, when the Youngman remarks with curse, "You wouldn't be in a good temper if you were in the fix I am in". But we know that the Youngman is not in the fix, rather it is Gortsby who is in a fix. Secondly, when the same Youngman speaks impressively, "I suppose you think I have spun you rather an impossible yarn", but later when Gortsby sees the packet of soap, the same false story becomes possible by the circumstances which is an irony. One more incidence of irony is when Gortsby convinces himself that it is a lesson not to act too cleverly in judging by circumstances and ultimately, we see that he falls prey to his own statement. Moreover, according to Gortsby, dusk is the hour of the defeated but at the end we come to know that it is the time when cunning and treacherous people take their revenge.

Q9. What is 'Juxtaposition'? Has Saki been able to juxtapose humour and pathos in "Dusk"?

Ans. Juxtaposition means to put things, events, characters or devices together in order to show a contrast or a new relation between them. In the story 'Dusk', Saki has juxtaposed humour and pathos in a very subtle manner. We see pathos in the description of the people who have been defeated by the struggles of life. There is pathos in the description of the elderly gentleman to whose piping no one dances. The leaving of the same elderly gentleman, who seemed to have lost interest in his life and coming in of the Youngman with cheerful face and pleasing personality, is an example of juxtaposition. Juxtaposition is further seen in the sentence "...and here is the soap. Don't lose it again. It has been a good friend to you". The words "It has been a good friend to you" bring out the elements of humour and the words "Don't lose it again" are full of pathos. The sentence "It is a lesson for me not be too clever in judging by circumstances" also bring elements of humour and pathos. "Humour" in a way Gortsby judges himself and "Pathos" for his poor and defeated condition.

The ending scene when the real owner of the soap comes to search his soap is also full of pathos.

Play:

The Proposal --- Anton Chekov

Thinking about the play

Q1. What does Chubukov at first suspect that Lomov has come for? Is he sincere when he later says "And I've always loved you, my angel, as if you were my son"? Find reasons for your answer from the play.

Ans. Chubukov, at first, suspects that Lomov has come to borrow money. Chubukov doesn't appear to

be sincere when he later says “And I’ve always loved you ,my angel, as if you were my son”, because when he comes to know that Lomov wishes to marry his daughter ,Natalya , he starts flattering him using various sweet and praising words.

Besides this, Chubukov is well aware that Lomov is a rich land owner and he doesn't want to miss the chance of marrying his daughter to him. So, he uses various courtiers to impress Lomov.

Q2. Chubukov says of Natalya:”...as if she won't consent! She's in love; egad, she's like a love sick cat...” Would you agree? Fund reasons for your answer.

Ans. Yes, we agree with Chubukov that Natalya is a love sick Cat. At first, Natalya had a hot argument with Lomov about the ownership of Oxen Meadows. She abused him and drove him out of her house. But the moment she learned that Lomov had come with a marriage proposal for her, she wailed and moaned for losing the golden chance of getting married. She insisted upon her father to call him back and decided to settle the dispute, forgetting about her ego and self-respect.

Q3. (a)

Find all the words and expressions in the play that the characters used to speak about each other, and the accusations and insults they hurl at each other

Ans. The words and expressions in the play that the characters used to speak about each other are:

1. My darling
2. My dear fellow
3. Honoured
4. My angel
5. My precious

The accusations and insults they hurl at each other are:

1. Petty-fogger
2. Guzzling gambler
3. Intrigued
4. Rascal
5. The scare crow
6. Blind hen
7. Confounded cheek
8. The wizen faced frump
9. You ought to sit at home with your palpitations
10. Pup
11. Old rat
12. Jesuit
13. You ought to go and lie on the kitchen oven and catch black beetles ,not go after foxes!
14. You Lomovs have had lunacy in your family
15. Hump-backed
16. Malicious ,double-faced intrigued
17. The villain
18. The monster
19. Turnip ghost
20. Stuffed sausage

(b) Think of five adjectives or adjectival expressions of your own to describe each character in the play

Ans. Stephan Stepanovitch Chubukov:-

1. Old landowner
2. Flatterer
3. Ingratiating (tries to impress the person to benefit himself)

4. Hypocrite
5. Diplomatic
6. Irresponsible father
7. Selfish
8. Egoist

Natalya Stepanovna:-

1. Quarrelsome
2. Egoist
3. Immature
4. Greedy
5. Well-educated
6. Love sick Cat
7. Maiden

Ivan Vassilevitch Lomov:-

1. Rich Landowner
2. Bachelor
3. Low-minded
4. Quarrelsome
5. Hypochondriac, suffering from palpitations
6. Well dressed
7. Assertive

(c) Can you now imagine what these characters will quarrel about next ?

Ans. The characters can quarrel about any petty thing. They can quarrel about previous two issues of Oxen Meadows and Pet dogs as they remained unsolved . Moreover ,they can also quarrel about their houses ,livestock peasants or other trivial issues.

Character sketch of Lomov

Ivan Vassilevitch is the main character of the play, "The Proposal". He is a nice gentleman and possesses all the traditional qualities of Russian gentry. He is a landowner who lives in the neighbourhood of Chubukov, another landlord. He is realistic and a man of principles. Being a bachelor of thirty-five, he is in need of a life partner and thinks that an educated woman is the best homemaker. So, he visits his neighbours, Chubukov to ask for the hand of his daughter Natalya in his marriage.

Lomov is not enough brave and bold to express him. He lacks confidence as he is not sure whether Natalya will accept his proposal or not. Instead of coming to the point, he starts talking irrelevantly. He reminds Natalya that his Oxen Meadows touch her Birch Woods. It is the land that, according to Lomov, he inherits from his late aunt. Natalya denies this and there starts a hot argument between the two which results in the quarrel.

Lomov has a weak heart and he suffers from palpitation. He is nervous, shy and gets excited very soon. He is not straight forward to speak his mind. He rumbles while discussing a serious issue of his life. He doesn't possess a smooth and amorous approach to handle female folk. He is insulted, abused and turned out of the house by Chubukov and his daughter. He is not as harsh as Chubukov or Natalya. No doubt, he is quarrelsome and short-tempered, but he is epitome of love sacrifice and humanity and is also quick to forgive others. On the whole, the character of Lomov is farcical and he serves the purpose of comedy very well as the play itself is a farce.

Character sketch of Natalya

Natalya Stepanovna is the second important character of the play, "The Proposal". She is young twenty-five year's old unmarried woman. She is the daughter of a landlord Chubukov and lives in the

neighbourhood of Lomov. Her father calls her a love sick cat as she thirsts for love. She is a cause of much worry to her father, who wishes to see her happily married. Though she is well-educated but she doesn't seem to be so. She is quarrelsome and abusive by nature. When Lomov comes to propose her for marriage, she begins a bitter quarrel with him over a strip of land (Oxen Meadows) that is of little value. She abuses and condemns him without any patience to listen to the whole story of Lomov. When she comes to know that he had come to propose her, she begins to wail over her missed chance of getting married. She insists upon her father to call him back. When Lomov comes back, she submits to him and is ready to accept him as her husband. But then she again starts quarrelling with him over the merits of their respective dogs. Natalya claims that her dog (Squeezer) is superior to that of Lomov's (Guess). Lomov goes on shouting in favour of his dog and at the same time complains of heart palpitation. The quarrel ends only when Lomov faints and falls down on the chair senseless. Natalya insists her father to call a doctor. As soon as Lomov comes back to his senses, Chubukov puts his daughter's hand in Lomov's and in this way she accepts the marriage proposal even without being made. Natalya is a funny girl. She doesn't know any restraint and all this makes her a very funny and farcical character.

Character sketch of Chubukov

Stephen Stepanovitch Chubukov is the third important character of the play, "The Proposal". He is a landowner who has a young daughter named Natalya. His greatest worry is to see his daughter married. He calls his daughter a love sick cat as she thirsts for love. One fine evening, Lomov visits him to ask for Natalya's hand for marriage. On hearing this, Chubukov is overjoyed. He embraces Lomov and congratulates him for this wise decision.

Chubukov is a man to be carried away easily. When Natalya and Lomov had an argument, he too joined in and insulted Lomov. He is put in an awkward situation by his whimsical and moody daughter. Twice he leaves his daughter alone with Lomov so that they may settle everything about their marriage. But twice he comes back to find them quarrelling, first over the meadows and the second time over their dog's breed. Chubukov's character is farcical and wins our sympathy as a loving father who does everything to make his daughter happy.

Describe the scene of first quarrel between Lomov and Natalya in the play, "The Proposal".

Lomov and Chubukov are neighbours since years. Lomov goes to Chubukov's house in order to make a marriage proposal to his daughter, Natalya. Instead of coming to the point, Lomov starts talking irrelevantly. He reminds Natalya that his Oxen Meadows; a piece of land, touch her Birch Woods; another piece of land. According to Lomov, it is the land that he inherits from his late aunt. Natalya denies this and there starts a hot argument between the two which results in the quarrel. Natalya claims that those meadows belong to her which has been their property for nearly three hundred years but, Lomov asserts that the meadows are his property. On hearing the cries of Lomov and Natalya, Chubukov comes in. He too joins the quarrel and takes the side of his daughter. Lomov and Chubukov exchange heart bitter words and Lomov threatens him that he will take the matter to court and very soon they start abusing each other. The quarrel becomes so intense that Lomov begins to have heart palpitation and he staggers out of their house, swearing at them.

Describe the scene of second quarrel in the play, "The Proposal"?

The first quarrel between Lomov and Natalya in the play, "The Proposal", was over the ownership of Oxen Meadows; a piece of land. When Lomov is brought back after the first quarrel, they start quarrelling over the merits of their dogs' breed --- Squeezer and Guess. Each claims their dog to be far superior to that of others. When Lomov comes back, Natalya changes the topic and asks him about the hunting. During their conversation, Lomov mentions that his dog, Guess is superior to that of Natalya's and he has paid 125 Roubles for his dog. Natalya feels surprised and denies the claim. She says that though he has paid a hefty price for his dog but her own dog is much better than his dog. The argument turns so bitter that it leads to another quarrel between the two. Each starts finding faults with the other's dogs. Just then Chubukov joins the quarrel. He calls Squeezer the best dog in the district. Lomov and Chubukov starts abusing each other and the quarrel ends only when Lomov faints and falls into an arm chair.



OASIS Hr. Sec. Educational Institute

SUBJECT: SCIENCE

MAGNETIC EFFECTS OF ELECTRIC CURRENT

Introduction

A magnet is a substance which has both attractive and directive properties. The property of attracting small pieces of iron is referred to as magnetism. Magnet or loadstone consists of number of oxides of iron with formula Fe_2O_3 . Later on in 1600, Dr. William Gilbert confirmed that earth itself behaved as another natural magnet.

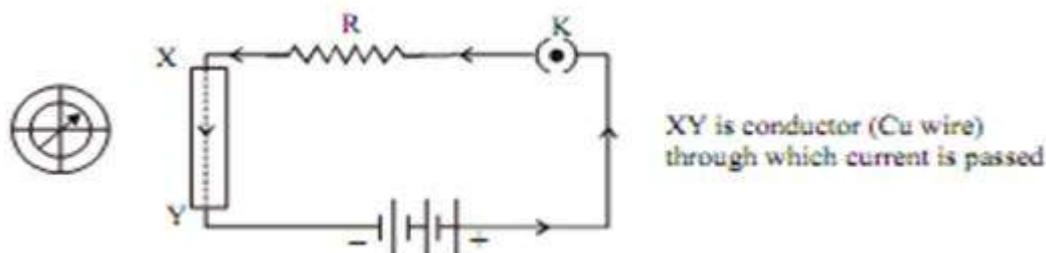
Earlier it was believed that electricity and magnetism are two separate branches and there is no connection between them. But later on Oersted confirmed that electricity and magnetism are closely linked.

Oersted's Experiment

Oersted showed that electricity and magnetism are related to each other. His research later used in radio, television etc.

According to his experiment, on passing the current through the copper wire XY in the circuit, the compass needle which is placed near the conductor gets deflected. If we reverse the direction of current, the compass needle deflects in reverse direction. If we stop the flow of current, the needle comes at rest.

Hence, it can be concluded that electricity and magnetism are linked to each other. It shows that whenever the current will flow through the conductor, then a magnetic field will develop.



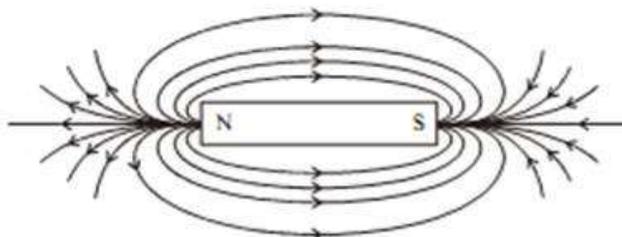
Magnetic Field It is the region surrounding a magnet, in which force of magnet can be detected. It is a vector quantity, having both direction & magnitude. The unit of magnetic field is Tesla.

Magnetic Field Lines: Magnetic field lines are imaginary lines the tangent to which at a point gives the direction of magnetic field at that point

Hence, magnetic field line is a path along which a hypothetical free north pole tends to move towards South Pole.

Characteristics of Magnetic field lines:

- (a) The direction of magnetic field lines outside the magnet is always from North Pole to South Pole of bar magnet and is indicated by an arrow. Inside the magnet, the direction of field lines is from its south pole to North Pole. Thus magnetic field lines are closed curves.
- (b) The strength of magnetic field is expressed by the closeness of magnetic field lines. Closer the lines, more will be the strength and farther the lines, less will be the magnetic field strength.
- (c) No two field lines will intersect each other. If they intersect, then at point of intersection the compass needle will show two directions of magnetic field which is not possible.
- (d) If the magnetic field lines are parallel to each other, magnetic field is said to be uniform. Otherwise it is non-uniform.



Magnetic field due to Current Carrying Conductor

Whenever a current flows through a conductor, it behaves as a magnet. In other words every current carrying conductor has a magnetic field associated with it. The magnitude of magnetic field depends on the amount of current flowing through conductor. The direction of magnetic field is given by right hand thumb rule.

Right Hand Thumb Rule

According to this rule the direction of magnetic field can be found as: Hold the straight wire carrying current in your right hand such that thumb points towards the direction of current, then your folded fingers around the conductor will show the direction of magnetic field. This rule also called Maxwell's corkscrew rule.

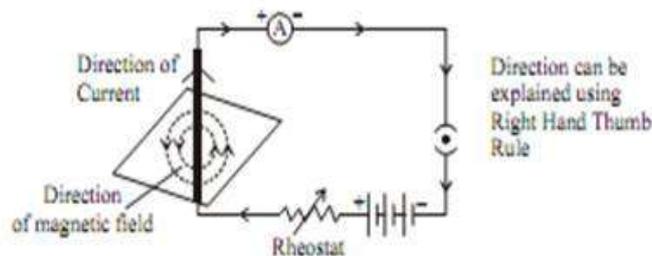
Magnetic Field due to Current through a Straight Conductor

We know that whenever a current flows through a conductor, it has a magnetic field associated with it. Let a current carrying conductor be suspended vertically and the electric current is flowing from south to north. In this case, the direction of magnetic field will be anticlockwise. If the current is flowing from north to south, the direction of magnetic field will be clockwise.

A current carrying straight conductor has magnetic field in the form of concentric circles; around it. Magnetic field of current carrying straight conductor can be shown by magnetic field lines.

It is found that magnetic field \propto strength of current

And magnetic field $\propto 1/\text{distance}$ from the conductor.



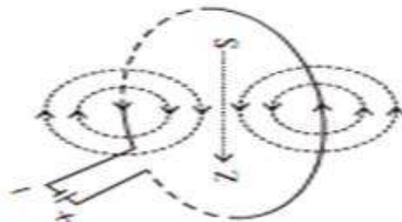
Magnetic Field due to Current through a circular Loop

Every point on the wire carrying current give rise to the magnetic field, appearing as a straight line at the centre of loop. By applying Right hand Thumb rule, we can find the direction of magnetic field at every section of the wire. The direction of magnetic field inside a loop is same.

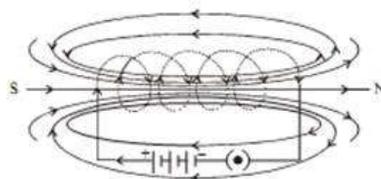
Magnetic field \propto strength of current

Magnetic field $\propto 1/\text{distance}$ from the conductor

Magnetic field \propto number of turns in coil



Solenoid: A Coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder is called solenoid.



Using R.H. Thumb Rule, we can draw the pattern of magnetic field lines around a current carrying 'Solenoid' and it is found that magnetic field is same as that of bar magnet.

One end of the solenoid behaves as a magnetic north pole, while the other end behaves as the South Pole. The field lines inside the solenoid are in form of parallel straight lines, that implies that

magnetic field inside the solenoid is same at all points i.e. Field is uniform.
The strength of the magnetic field produced depends upon

- (a) The number of turns.
- (b) Strength of current in the solenoid.

Electromagnet: It is a temporary magnet which is obtained by wrapping a current carrying wire around a magnetic substance usually soft iron. It behaves as a magnet as long as current flows through it. Once the current is stopped, it loses its magnetism.

It must be noted that: a) its strength of magnetic field can be varied.

b) Its polarity can be reversed by reversing the direction of current.

c) These are generally strong magnets.

Force on a current carrying conductor in a magnetic field.

Andre Marie Ampere (1775–1836) suggested that the magnet also exert an equal and opposite force on the current carrying conductor.

Whenever a current carrying conductor is placed in a magnetic field, it experiences a force whose magnitude is given by

$$F = BIL \sin \theta$$

The force is maximum when direction of current is perpendicular to the direction of magnetic field.

The direction of the exerted force will be reversed if the direction of current through the conductor is reversed or by interchanging the two poles of magnet.

Therefore the direction of exerted force depends on

- (a) Direction of current
- (b) Direction of magnetic field lines.

The direction of force on a conductor is given by Fleming's Left Hand Rule.

Left Hand Fleming Rule

According to this rule, stretch thumb, forefinger, and middle finger of your left hand such that they are mutually perpendicular to each other.

If fore finger represent direction of magnetic field & middle finger represent direction of current, and then thumb will point in the direction of motion or force acting on the conductor.

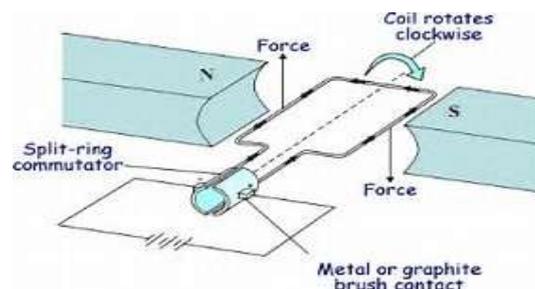
ELECTRIC MOTOR:

Electric motor is a device which converts electrical energy into mechanical energy. It is based on the principle that whenever a current carrying conductor is placed in a magnetic field, it experiences a force.

Working

In an electric motor, a rectangular coil is suspended between the two poles of a magnetic field. The electric supply to the coil is connected with a Commutator. Commutator is a device which reverses the direction of flow of electric current through a circuit.

When electric current is supplied to the coil of electric motor, it gets deflected because of magnetic field. As it reaches the half way, the split ring which acts as Commutator reverses the direction of flow of electric current. Reversal of direction of current reverses the direction of forces acting on the coil. The change in direction of force pushes the coil; and it moves another half turn. Thus, the coil completes one rotation around the axle. Continuation of this process keeps the motor in rotation.



Note: In commercial motor, electromagnet; instead of permanent magnet; and armature is used. Armature is a soft iron core with large number of conducting wire turns over it. Large number of turns of conducting wire enhances the magnetic field produced by armature.

Electromagnetic Induction: whenever a magnetic field linked with a conductor changes, electric current is induced in the conductor. This was first of all discovered by Michael Faraday.

The strength of the induced current is directly proportional to the rate of change of magnetic field.

The direction of the induced current is given by Fleming's Right Hand rule.

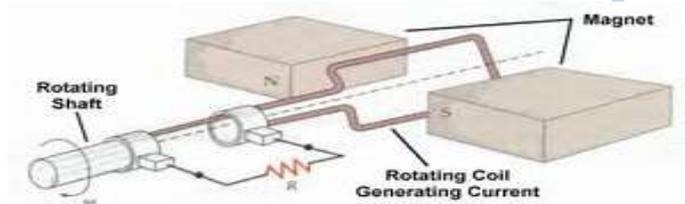
Fleming's Right Hand rule: Stretch, thumb, forefinger, and middle finger of right hand, so that they are perpendicular to each other. The forefinger indicates direction of magnetic field, thumb shows the direction of motion of conductor, and then the middle finger will show the direction of induced current.

[Galvanometer: It is an instrument that can detect the presence of a current in a circuit. If pointer is at zero (the centre of scale) then there will be no flow of current.]

ELECTRIC GENERATOR:

Electric generator is a device which converts mechanical energy into electrical energy. It is based on the principle of electromagnetic induction i.e. whenever a magnetic field linked with a conductor changes, current is induced.

The structure of electric generator is similar to that of an electric motor. In case of an electric generator a rectangular armature is placed within the magnetic field of a permanent magnet. The armature is attached to wire and is positioned in way that it can move around an axle.



When the armature moves within the magnetic field an electric current is induced. The direction of induced current changes when the armature crosses the halfway mark of its rotation. Thus, the direction of current changes once in every rotation. Due to this, the electric generator usually produces alternate current, i.e. AC. To convert an AC generator into a DC generator, a split ring Commutator is used. This helps in producing direct current.

Electromagnetic Induction: Can be explained by two experiments

(a) First Experiment. "Self-Induction"

In this experiment, when the north pole of bar magnet is brought closer to the coil or away from the coil, we see momentary deflection in the needle of galvanometer on either side of null point. First right and then left.

Similarly, if we keep the magnet stationary and coil is made to move towards or away from the north pole of magnet. Again we will observe deflection in the needle of galvanometer.

If both bar magnet and coil are kept stationary, there will be no deflection in galvanometer.

This experiment can also be done with the south pole of magnet, we will observe the deflection in galvanometer, but it would be in opposite direction to the previous case.

It concludes that motion of magnet with respect to coil or vice-versa, changes the magnetic field. Due to this change in magnetic field lines, potential difference is induced in the same coil, which set up an induced current in the circuit.

(b) Second Experiment: "Mutual Induction"

In this experiment plug in the key that connects coil with battery and observe the deflection in galvanometer. Now plug out the key that disconnect the coil-1 from battery and observe the deflection in galvanometer, which will be in reverse direction.

Hence, we conclude that potential difference is induced in secondary coil (coil-2), whenever there is a change in current, in primary coil (coil-1) (by on and off of key). This is because, whenever there is change in current in primary coil, Magnetic field associated with it also changes. Now, magnetic field lines around the secondary coil (coil-2) will change and induces the electric current in it (observed by the deflection of needle of Galvanometer in secondary circuit).

This process, by which changing of strength of current in primary coil, induces a current in

secondary coil is called Electromagnetic Induction”

Domestic Electric Circuits:

In our homes, the electric power supplied is of potential difference $V = 220V$ and frequency 50Hz.

It consists of three wires:–

- (1) Wire with red insulation cover – LIVE WIRE (POSITIVE) Live wire is at high potential of 220V
- (2) Wire with black insulation cover – NEUTRAL WIRE (NEGATIVE) Neutral wire is at zero potential Therefore, the potential difference between the two is 220V.
- (3) Wire with Green insulation cover – EARTH WIRE

It is connected to a copper plate deep in the earth near house.

The metallic body of the appliances is connected with the earth wire as a safety measure.

Earth wire provides a low resistance to the current hence any leakage of current to the metallic body of the appliances; keep its potential equal to that of earth. That means zero potential and the user is saved from severe electric shock.

Short Circuiting

Due to fault in the appliances or damage in the insulation of two wires, the circuit will offer zero or negligible resistance to the flow of current. Due to low resistance, large amount of current will flow.

According to Joule’s law of heating effect, heat is produced in live wire and produces spark, damaging the device and wiring.

Overloading

Overloading can be caused by (1) Connecting too many appliances to a single socket or (2) accidental rise in supply voltage if the total current drawn by the appliances at a particular time exceeds the bearing capacity of that wire, it will get heated up. This is known as overloading. Fuse a safety device can prevent the circuit from overloading and short circuiting.

CHAPTER NUMBER: 5 SOURCES OF ENERGY

Q1. What is energy? What does source of energy mean? What is a good source of energy?

Ans. Energy is defined as the ability to do work. Energy is an essential requirement of our life. Energy is required in every field of life. For example energy is needed to operate machines in factories, to operate buses, cars, T.V., washing machine etc.

Anything which supplies useful energy to us to carry out the various activities is known as source of energy. There are many sources of energy like wood, wind, water coal, petroleum etc. But sun is the ultimate source of energy.

A good source of energy would be one:

1. Which would do a large amount of work per unit mass or volume?
2. Which is easily available?
3. Which is easy to store and transport?
4. Which is safe to handle and use?
5. Which does not cause environmental pollution?
6. Most importantly, it should be economical.

Q2. Give classification of sources of energy?

Ans. Sources of energy can be classified as:

Conventional or Non-renewable sources of energy:

Q3. Define fuel? What are the characteristics of an ideal or good fuel?

Ans. Fuel is a combustible substance which on burning gives large amount of heat containing carbon as main constituent. It can be used economically for domestic and industrial purposes. Wood, charcoal, kerosene, petrol, oil gas, etc. are some examples of fuel.

Characteristics of an ideal fuel or characteristics of a good fuel

1. It should have high calorific value.
2. It should have moderate ignition temperature.
3. It should contain low moisture and non-combustible matter content.
4. It should have moderate velocity of combustion.
5. It should be economical i.e. it should be cheap.
6. It should be easy to transport.
7. Combustion should be controllable.
8. It should be easy to store.
9. It should burn without smoke and should produce minimum pollution.

Q4. Define the following terms:

1. Calorific value: Calorific value of a fuel is defined as the total amount of heat liberated when a unit mass (or volume) of the fuel is burnt completely. The unit mass taken for measuring the calorific value of a fuel is "gram". So in other words, the amount of heat energy released in calories or kilocalories by burning 1 gram of fuel completely is called its calorific value. The unit of calorific value is expressed in calorie/gram (cal/g) or joule/gram (J/g). Hydrogen has the highest calorific value (150kJ/g).

2. Ignition temperature: It is the minimum temperature to which the fuel must be pre heated so that it starts burning smoothly. A substance can't burn as long as its temperature is lower than the ignition temperature. Low ignition temperature is dangerous for storage and transport as it may catch fire spontaneously. On the other hand high ignition temperature causes difficulty in igniting the fuel. Hence an ideal fuel should have moderate ignition temperature.

3. Fossil fuels: The combustible substances formed from the dead remains of animals and plants which were buried deep under the surface of the earth over millions of years are called fossil fuels. Examples of fossil fuels are coal, petroleum and natural gas.

Q5. What is coal? Explain the formation of coal?

Ans. Coal is a fossil fuel that has been formed as a result of alteration of vegetable matter under certain favourable conditions with carbon as its main constituent. It is chiefly composed of carbon, hydrogen, nitrogen and oxygen.

Formation of coal: Millions of years ago, a large portion of the earth was covered by swamps. In these swamps, plants like ferns grew in plenty. These plants extracted carbon from carbon dioxide present in atmosphere and converted it into carbohydrates in presence of sunlight by the process of photosynthesis. With the passage of time, thick forests of fern trees were buried under the crust of earth. The thickness of the soil over these buried trees kept increasing with the passage of time. Thus the pressure over the buried trees increased. Due to this increased pressure, water and gases were driven off and the increased temperature converted the buried trees into coal in the absence of oxygen.

Q6. Give different varieties of coal? Also give its uses.

Ans. The different varieties of coal are:

Anthracite coal: it is the best quality of coal containing 92-98% of carbon and has lowest volatile and moisture contents.

Bituminous coal: it contains 78% to 90% of carbon. It shows a laminated structure of alternate very bright and dull layers.

Lignite: they are soft brown coloured variety of lowest ranked coals which consists of carbon content 60-70% of carbon.

Peat: it is the first stage in the coalification of wood.

Uses of Coal are:

1. It is used for cooking food and heating water.
2. It is used in thermal power plant to produce electricity.
3. It is used by black smiths to melt gold and other metals.
4. It is used in brick kilns and other industries.

Q7. What is coke? How is coke prepared? Give its uses.

Ans. Coke is high carbon content product obtained by the destructive distillation of coal. It contains 98% of carbon as its constituent.

Preparation: When the coal is subject to strong heat in the absence of air, all the volatile matter is removed from coal and coke is obtained.

Coke is better fuel than coal because it produces more heat than an equal mass of coal and it does not produce smoke while burning. Thus burning of coke does not cause air pollution.

USES: Coke is used as a reducing agent in the extraction of metals from the ores. It is also used for making fuel gases like water gas and producer gas.

Q8. What is petroleum? How is petroleum formed? Explain the refining of petroleum?

Ans. Petroleum (petra= rock; oleum = oil) is a dark greenish –brown viscous oil found deep in earth's crust. It is composed mainly of hydrocarbons together with small amount of organic compounds containing oxygen, nitrogen and sulphur.

Formation of petroleum: Petroleum has resulted from the decomposition of marine animals and vegetable organisms of pre-historic forests millions of years ago. Changes in earth has buried these materials underground, where they have been subjected to intense pressure and heat with the passage of time. The conversion of these materials into various hydrocarbons has been going on by the bacterial decomposition under anaerobic and strongly reducing conditions and high temperature under high pressure. This rock oil got trapped between two layers of impervious rocks.

Refining of petroleum: Petroleum which exists in the rocks of earth is in a crude form. This crude oil is a mixture of various hydrocarbons. These hydrocarbons have different properties such as some are more volatile and some are least volatile. Thus, various hydrocarbons can be separated and purified.

The process of separating and purifying the various hydrocarbons by fractional distillation taking into account their different boiling points is called refining of petroleum. Refining of petroleum is done in fractional column tube. The products of petroleum are petroleum gas, petrol, kerosene oil, diesel oil, lubricating oil, paraffin wax and asphalt. Lubricating oil, paraffin wax and asphalt are not used as fuel as they do not burn readily.

Q9. What is L.P.G.? Give its uses and advantages?

Ans. Petroleum gas which is liquefied under pressure is known as liquefied petroleum gas (L.P.G.). It is obtained as a by-product during the cracking of heavy oils or from natural gas. It is dehydrated, desulphurised and traces of mercaptans are added to give warning of gas leak. Its main constituent is butane with small amount of propane and ethane. It is supplied under pressure in containers under the trade name like Indane, Bharat gas etc.

Uses: the largest use of L.P.G. at present is as domestic fuel and industrial fuel.

Advantages:

1. It has high efficiency and high calorific value.
2. It is completely combustible leaving no ash.
3. It needs little care.
4. It is highly flexible and easy to control.
5. It is easy to handle and store.

Q10. What is natural gas? Give its uses?

Ans. Natural gas is obtained from wells dug in the oil bearing regions. It mainly consists of methane (97%) and small quantities of ethane and propane.

When natural gas in liquid form is subjected to high pressure we get compressed natural gas (CNG).

Uses:

1. It is used as fuel for scooters, buses and trucks.
2. It is used for cooking food and heating water.
3. It is used to produce electricity.
4. It is used for the manufacturing fertilizers.

Q11. What are the disadvantages of fossil fuels?

Ans. The disadvantages of fossil fuels are:

1. Burning of fossil fuels such as coal and petroleum cause air pollution.
2. Burning of fossil fuels produces large number of harmful gases such as carbon monoxide.
3. The oxides of carbon, nitrogen and sulphur that are released on burning fossil fuels are acidic oxides. These lead to acid rain.
4. Carbon dioxide which is released on burning of fossil fuels causes global warming.
5. They do not supply enough heat energy.

Q12. Explain hydroelectricity? What are its advantages?

Ans. The electricity produced by the flowing water is known as hydroelectricity. A plant used to produce hydroelectricity is known as hydro-electric power plant.

A dam is constructed on the river. The energy of the stored water in the dam is potential energy. The water in a dam is allowed to fall on the water turbine. Thus potential energy of stored water is converted into kinetic energy of falling water. As a result of this. The turbine rotates whose axle is connected with the armature of the generator. The armature of the generator rotates within two poles of a strong magnet. The rotation of the armature of the generator in the magnetic field gives rise to induced electric current or electricity. This electricity is transmitted to the sub stations through a transformer for further distribution to the houses and factories.

Advantages of hydroelectric power plant:

1. Hydroelectric power is pollution free.
2. Hydroelectric power plant helps to control floods.
3. Water used to generate electricity can also be used for the irrigation purpose in the nearby areas.
4. It helps in developing fishing zones.
5. It helps in developing water sports for recreation.

Q13. What is wind? How is wind caused?

Ans. Do yourself

Q14. Explain the construction and working of wind mill?

Ans. A device used to convert wind energy into the mechanical energy is called wind mill. This mechanical energy can be converted into some useful form of energy like electrical energy. When wind mill is used to produce electricity it is called wind generator.

Construction: it consists of a wheel with blades cut into its outer rim. The wheel rotates about an axle mounted on a pole.

Working of wind mill to produce electricity: Electricity is produced when an armature of a generator rotates between two poles of a strong magnet. When wind falls on the wheel of a wind mill, it rotates. The axle of the armature is connected to the shaft of the wind mill. So, the armature of the generator rotates between two poles of a magnet along with the rotation of the wheel of the wind mill. Thus, electric current or electricity is produced.

Uses of wind mill: it is used for operating water pumps, grinders and is also used to produce electricity.

Q15. Sun is ultimate source of energy? Discuss. Or explain solar energy? Solar constant.

Ans. The energy emitted by the sun in the form of heat and light is called solar energy. Sun is the ultimate source of energy. The sunlight falling on the earth delivers energy which is 50,000 times the total energy used all over the world in 1 year. However, this energy reaches the surface of earth in a much diffused form. Every square metre of earth's upper atmosphere receives 1.36kJ of energy per second. However of this only 0.64kJ of solar energy reaches every square metre of earth's surface. In order to use solar energy for practical purposes, it has to be collected and concentrated on specific points. Naturally, solar energy is trapped by autotrophs to prepare food by the process of photosynthesis. Artificially, solar energy is trapped by various man made devices like solar cells, solar cooker, solar heater etc. However, there technology needs to be improved to use the solar energy efficiently.

Solar constant: solar constant is defined as the energy received from the sun in one second per unit square metre area of the outer edges of earth's atmosphere exposed perpendicular to the radiation of the Sun at an average distance between the earth and the Sun.

Q16. Explain solar cell?

Ans. A device which converts sunlight (or solar energy) into electrical energy is known as solar cell. Solar cell is made up of semiconductor material such as silicon. A solar cell is made of layers or wafers of semiconductor material containing impurities. These layers are placed one over the other. When the sunlight falls on these wafers, a potential difference is developed between the two regions of semiconductor's wafers. This potential difference gives rise to an electric current. The amount of current depends on the efficiency of the cell and the amount of the sunlight present. Usually a solar cell provides 0.5V –1.0V potential difference when placed in sunlight. Due to little current produced, a group of solar cells are connected to each other in a certain pattern forms a solar panel. The efficiency of solar panel is much more as compared to a single solar cell. Solar panel converts sunlight into electrical energy which can be stored in batteries connected to it. The batteries supply the current to the appliances like electric tubes etc. connected to it.

Q17. Explain box type solar cooker?

Ans. Construction: Box type Solar cooker consists of a wooden rectangular box in which a metallic box painted black is fitted. The space between wooden box and metallic box is filled with an insulating material. The metallic box is covered by a thick glass sheet. A plane mirror reflector is used to reflect the sun rays and attached to the box. The uncooked food placed in a black container is put inside the box.

Working: The plane mirror reflector is adjusted in such a way that maximum sun light falls on it. The light reflected by the plane mirror falls on the thick glass sheet cover. The heat radiations from the sun pass through the glass and are absorbed by the black container placed in the box and the black surface of the box. The heat radiations entered in the box are not able to come out of the box through the glass sheet. Thus, the heat radiations are trapped in the box and the inner part of the box becomes hot. The temperature inside the box increases from 100°C to 140°C. Thus, food in the container is cooked.

Q18. Give the advantages of box type solar cooker?

Ans. The various advantages of box type solar cooker are:

1. The cost of cooking food in the solar cooker is very small. Hence it is economical.
2. No pollution is caused as there is no burning of fuel.
3. Nutrition value of food is preserved as the food is cooked at low temperature and slowly.
4. It prepares food from solar energy which is renewable energy.

Q19. Give the uses of solar cells?

Ans. The various uses of solar cells are:

1. They are used in wrist watches and calculators.
2. They are used to generate electricity needed in artificial satellites.
3. They are used to operate electric bulbs and tubes in remote areas where hydroelectricity is not available.
4. They are used to operate radio sets in remote areas.

Q20. What is biomass? What is biomass energy?

Ans. Biomass is the waste organic matter that has been produced by the photosynthesis directly or indirectly and potentially useful as energy source. The energy obtained from biomass is called bio-energy. Biomass includes wood, cow dungs, poultry wastes, vegetable wastes etc.

Q21. How is charcoal prepared? Why charcoal is better fuel than wood? Explain.

Ans. The product obtained from the destructive distillation of wood is called charcoal.

Preparation: When wood is subject to strong heat in the absence of air, all the volatile matter is removed from wood and charcoal is obtained.

Charcoal is better fuel than wood because of the following reasons:

1. When charcoal is burned in the presence of air, it does not produce smoke. On the other hand, burning of wood in the presence of air produces lot of smoke.
2. The heat produced by the charcoal is much higher than the heat produced by burning equal mass of wood.
3. Charcoal occupies less space, so it poses no problem of storage. On the other hand wood is difficult to store and occupies lot of space.
4. Charcoal is easily transported from one place to another as compared with wood.
5. Charcoal burns easily as compared to the wood.

Q22. What is biogas? How is it prepared? What are its advantages over cow dung?

Ans. Biogas is a mixture of various gases such as methane (CH_4), carbon dioxide (CO_2), hydrogen (H_2) and hydrogen sulphide (H_2S). The chief constituent of biogas is methane gas which is about 75% by volume.

Preparation: Biogas is produced by the degradation of biological matter by the bacterial action in the absence of oxygen. It is prepared in a plant which has dome-like structure. A Slurry of cow-dung and water is mixed in inlet chamber and then is fed into the digester tank which is sealed till slurry level becomes nearly equal to the cylindrical top level. The slurry undergoes fermentation in the presence of anaerobic bacteria with gradual evolution of bio gas which starts collecting in dome shaped space. In few days decomposition process is completed. Biogas collected in dome is taken out through outlet pipes. From the overflow tank, the spent slurry is withdrawn which is a good manure.

Advantages over cow dung:

1. Biogas is very economical than the cow dung.
2. It burns without smoke. On the other hand cow dung on burning produced lot of smoke.
3. It does not contain poisonous gas, CO as an ingredient while cow dung contains it.
4. It provides simultaneously excellent yield of good manure while burning of cow dung produces ash.

Q23. Explain how energy from sea is harnessed?

Ans. The sun heats the water in the oceans. As a result water in oceans is a store house of heat energy. Energy from the seas or oceans is available in the following forms:

1. *Energy of sea waves:* High winds blow across the sea. These winds produce high waves on the surface of the water in the sea or ocean. Thus. The water in the sea moves as water waves. The kinetic energy is possessed by the waves is used to rotate the turbine of a generator. and electricity is produced. For example; a hollow tower is built near the seashore. When water gushes in the tube because of wave, it forces the air upwards. The kinetic energy of air in the tube is used to run the turbine. When the wave goes down air from the up goes down the tube which is also used to rotate the turbine. Turbine is connected with armature of generator and hence electricity is produced.

2. *Tidal energy:* the alternative rise and fall of water of the ocean twice in nearly 24 hours is known as tide. The tides are caused due to the gravitational force of attraction exerted by the moon and to some extent by the sun on the water of the ocean. At the time of new and full moon, when the sun and the moon are in a straight line, tides are very high. When the sun and the moon are at right angle from the earth, tides are low. The kinetic energy of water waves during tides is used to produce electricity.

Tidal power plants are constructed near narrow bays. During tides the gates of the dam are opened. The rising water is allowed to fall on the turbine of the generator which produces electricity. Thus the kinetic energy of water is converted into electrical energy. During low tides, gates of the dams are closed and hence water level behind the dam rises. This raised water has potential energy. Again the gates are opened and the water is allowed to fall back into the bay. This falling water rotates the turbine of the generator. Hence electricity is produced continuously.

3. *Ocean thermal energy:* The heat energy due to the temperature difference between the different layers of water in the ocean is known as ocean thermal energy.

A device used to obtain ocean thermal energy is known as ocean thermal energy conversion. Power plant. For operating OTEC power plant, temperature difference of 20oC or more between the surface water of ocean and water deep into the ocean is required. The warm surface water of ocean is used to boil liquid like ammonia. The vapours of this liquid at high pressure are used to rotate the turbine of the generator to produce electricity. The unused vapours are again converted into liquid by the cold water pumped up from the deep ocean. This process is repeated time and again to convert ocean thermal energy into electric energy.

Q24. Explain geothermal energy? Give its advantages?

Ans. Geo means earth and thermal means heat. Thus, geothermal energy is the heat energy from the hot rocks present in the earth. This heat energy can be used to as a source of energy to produce electricity. It is one of the few sources of energy that do not come directly or indirectly from solar energy. The mantle of the earth has molten mass called magma. This magma consists of molten rocks at very high temperature. Due to some geological changes, the hot magma rises up and is collected in some regions of crust of the earth called hot spots. When the underground water come in contact with these hot spots, vapours are formed which rise up to earth's surface in the form of hot springs. The steam of underground water is usually taken out by sinking pipes through holes drilled in the earth's crust. This steam under pressure is used to rotate the turbine of the generator to produce electricity.

Advantages of geo thermal energy:

1. It can be converted continuously into electricity throughout the year.
2. It causes no pollution, so it is environmental friendly.
3. The cost of converting geo thermal energy into electricity is very less.

Q25. What is nuclear energy? Explain nuclear fission and nuclear fusion.

Ans. The energy released during nuclear reaction is called nuclear energy. The nuclear energy is obtained in two types of nuclear reactions:

Nuclear Fission and Nuclear Fusion.

Nuclear Fission: The process of splitting a heavy nucleus into light nuclei along with the release of large amount of energy when bombarded with a thermal neutron is known as nuclear fission. In the nuclear fission, when the heavy nucleus is bombarded by the slow moving neutron, the sum of masses of the produced nuclei and neutrons is less than the mass of the heavy nucleus bombarded and the

thermal neutron. It is called mass defect. It is this mass defect which appears in the form of tremendous energy according to the Einstein's mass energy relation. If the fission reaction is controlled, the energy produced during the process can be used in a useful manner.

For example; when $^{92}\text{U}_{235}$ is bombarded with the slow moving neutron, barium ($^{56}\text{Ba}_{141}$) and krypton ($^{36}\text{Kr}_{92}$) along with 3 neutrons and tremendous energy is produced. The energy produced per fission of $^{92}\text{U}_{235}$ is about 200MeV.



Nuclear Fusion: The process in which two or more light nuclei fuse together to form heavy nucleus along with the release of energy is called nuclear fusion. The nuclei can be fused together if they move with very high speed to overcome the force of repulsion between them. This can happen if the temperature is very high (10⁷K). At this temperature the electrons of the light nuclei are completely detached and hence we get a bare nucleus and free electrons. The collision of the bare nuclei moving with very high speed fuse together to form heavy nuclei. During fusion, the sum of mass of produced nuclei is less than the reactant nuclei and hence there is a mass defect. It is this mass defect which appears as energy according to the Einstein's mass relation.

For example; when two nuclei of deuterium (d or $^1\text{H}_2$) fuse together heavy nucleus of helium is formed and also neutron is emitted along with huge energy.



OASIS Hr. Sec. Educational Institute

METALS AND NON METALS

CHAPTER: 4

Introduction

Element is a pure substance made up of same kind of atoms. For example, the element carbon is made up of carbon atoms. At present, nearly 118 elements are known. All the materials around us are made up of chemical elements, which are found in the earth's crust. Elements have been mainly classified into metals and non-metals. Only few elements with the characteristics of both are present called metalloids. Earth is the source of coal, petroleum, graphite, diamond and many other minerals of metals and non-metals.

Q1. What are metals? Give their physical properties?

Ans. Metals are the elements which are malleable and ductile and are good conductors of heat and electricity. During chemical reactions, metals form positive ions by losing electrons. Metals are widely used in our daily life for a large number of purposes. Some of examples of metals are: iron, aluminum, copper silver, gold etc.

Physical properties of metals:

1. Metals are malleable, that is, metals can be beaten into thin sheets with a hammer without breaking. Gold and silver metals are the best malleable metals.
2. Metals are ductile, that is, metals can be drawn into thin wire. It is another important characteristic property of metals. Good is the most ductile metal.
3. Metals are good conductors of heat, that is, metals allow heat to easily pass through them. Silver is the best conductor of heat.
4. Metals are the good conductor of electricity. It means that they allow electricity to pass through them easily. Silver metal is the best conductor of electricity.
5. Metals are lustrous or shiny and can be polished, that is, they have shiny surface. Metals lose their shine or brightness on keeping in air for a long time.
6. Metals are generally hard. However, sodium and potassium are soft metals which can be easily cut with a knife.
7. Metals are solid at room temperature except mercury which is liquid at room temperature.
8. Metals have high melting and boiling points except sodium and potassium which have low melting and boiling points.
9. Metals have high density except sodium and potassium which have low density.

Q2. What are non-metals? Give their physical property?

Ans. Non-metals are elements which are neither malleable nor ductile and are not good conductors of heat and electricity. They are brittle. During chemical reaction non-metals can form negative ions by gaining electrons. They also play an important part in our life. Some of the examples of non-metals are: oxygen, carbon, sulphur, neon, argon etc.

Physical properties of non-metals:

1. Non-metals are neither malleable nor ductile it means that they can't be turned into foils or thin wires.
2. Non-metals are brittle, that is, they can be easily broken. It is the characteristic property of non-metals.
3. Non-metals are not good conductors of heat and electricity except carbon (graphite) which is a good conductor of electricity.
4. Non-metals are not lustrous or shiny. They are dull. They do not have shiny surface.
5. Non-metals are generally soft except diamond which is very hard substance.
6. Non-metals may be solid, liquid or gases at room temperature.
7. Non-metals have comparatively low melting and boiling points except diamond which has very high melting and boiling points.
8. Non-metals have low density except diamond which has high density

Q3. (a) Explain the chemical properties of metals?

Ans. The important chemical properties of metals are:

1. Reaction of Metals with oxygen (or air): When metals are burnt in air, they react to form metal oxide. Metal oxides are basic in nature and hence, they turn red litmus solution blue. The vigour of reaction with oxygen depends on the chemical reactivity of metal.

Examples: Sodium metal reacts with oxygen of air at room temperature form a basic oxide called sodium oxide.



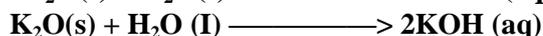
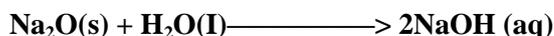
When copper is heated in air, it combines with oxygen to form copper (II) oxide, a black oxide.



Similarly, aluminium forms aluminium oxide.



Most metal oxides are insoluble in water but some of these dissolve in water to form alkalis. Sodium oxide and potassium oxide dissolve in water to produce alkalis as follows:



2. Reaction of Metals with water: Metals react with water to form a metal hydroxide (or metal oxide) along with the liberation of hydrogen gas. However, all metals do not react with water. The intensity of reaction of a metal with water depends on its chemical reactivity.

When a metal reacts with water (cold or hot), then the products formed are metal hydroxide and hydrogen gas.

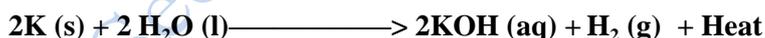
Metal + water \longrightarrow Metal hydroxide + hydrogen

When the metal reacts with steam, then the products formed are metal oxide and hydrogen gas.

Metal + Steam \longrightarrow Metal oxide + hydrogen

Examples:

(i) Potassium and sodium metals react violently even with cold water to form their respective hydroxides with the evolution of hydrogen gas.

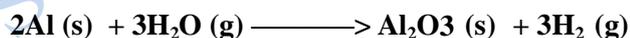


Clearly, both the reactions are exothermic reactions.

(ii) Calcium reacts with water to form calcium hydroxide with the evolution of hydrogen gas but the reaction is not violent.



(iii) Aluminium reacts with steam to form aluminium oxide with the evolution of hydrogen gas.



Metals like lead, copper, silver and gold do not react with even steam.

3. Reaction of metals with dilute Acids: Metals react with dilute acids to form metal salts by displacing hydrogen from dilute acids. However, all the metals do not react with dilute acids. The vigour of reaction depends on the chemical reactivity of metals.

Examples:

(i) Sodium metal reacts violently with dilute hydrochloric acid to form sodium chloride with the evolution of hydrogen gas.



(ii) Magnesium reacts quite rapidly with dilute hydrochloric acid forming magnesium chloride and also evolving hydrogen gas.



Copper does not react with dilute hydrochloric acid at all.

- 4. Reaction of metals with salt solutions:** When a more reactive metal is put in the salt solution of a less reactive metal, then the more reactive metal displaces the less reactive metal from its salt solution.

Examples: The reaction of zinc with copper sulphate solution: when a strip of zinc metal is put in copper sulphate solution, then the blue colour of copper sulphate solution fades gradually due to the formation of colourless zinc sulphate solution and red brown copper metal is deposited on the zinc strip:



If silver metal is put in copper sulphate solution, so reaction takes place since silver is less reactive than copper.

- 5. Reaction of metals with chlorine:** Metals react with chlorine to form ionic chloride. In the formation of metal chlorides, metal atoms lose electrons and become positively charged ions, whereas chlorine atom gains electrons and become negatively charged ions. Metal chlorides are usually solids and conduct electricity.

Examples: sodium reacts readily with chlorine to form an ionic compound called sodium chloride. $2\text{Na} (\text{s}) + \text{Cl}_2 (\text{g}) \longrightarrow 2\text{NaCl} (\text{s})$

Calcium reacts with chlorine to form calcium chloride $\text{Ca} (\text{s}) + \text{Cl}_2 (\text{g}) \longrightarrow \text{CaCl}_2 (\text{s})$

- 6. Reaction of metals with Hydrogen:** Most of the metals do not react with hydrogen. However, some metals like sodium, potassium, calcium and magnesium react with hydrogen to form metal hydrides. Metal hydrides are ionic compounds formed by the transfer of electrons from metal atom to hydrogen atom.

Examples; when hydrogen gas is passed over heating sodium, the sodium hydrides are formed.

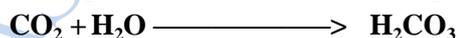
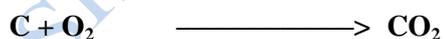


Q3. (b) Explain the chemical properties of non-metals?

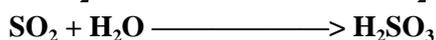
Ans. The important chemical properties of non-metals are given below:

- 1. Reaction of non-metals with oxygen:** Non-metals react with oxygen to form acidic oxides or neutral oxides. The acidic oxides of non-metals dissolve in water to form acids.

Examples: when carbon burns in air it reacts with oxygen of air to form acidic oxide called carbon dioxide.



When sulphur reacts with oxygen it forms sulphur dioxide which is an acidic oxide.



2. Non-metals do not react with water
3. Non-metals do not react with dilute sulphuric acid.
- 4. Reaction of Non-metals with salt solutions:** When a more reactive non-metal is passed over a salt solution of less reactive non-metal, less reactive non-metal from its salt is displaced.

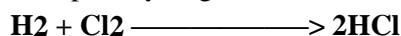
Example; when chlorine is passed through a solution of sodium bromide, then sodium chloride and bromine are formed.





5. Reaction of non-metals with chlorine: non-metals react with chlorine to form covalent chloride which is non-electrolytes. Non-metals are usually liquids or gases.

Example; hydrogen reacts with chlorine to form a covalent called hydrogen chloride.



6. Reaction of non-metals with hydrogen: non-metals react with hydrogen to form covalent hydrides.

Example; sulphur reacts with hydrogen to form a covalent compound called hydrogen sulphide.



Q4. Write down the uses of metals and non-metals?

Ans. **USES OF METALS:**

1. Copper and aluminium metals are used to make wires to carry electric current.
2. Iron, copper and aluminium metals are used to make house-hold utensils and factory equipment.
3. Zinc is used for galvanizing iron to protect it from rusting.
4. Chromium and nickel metals are used for electroplating and in the manufacture of stainless steel.
5. Silver and gold metals are used to make jewellery.
6. The liquid metal mercury is used in thermometers.
7. Zirconium metal is used in making bullet-proof alloy steels.

USES OF NON-METALS

1. Hydrogen is used in the hydrogenation of vegetable oils to make vegetable ghee.
2. Carbon (graphite) is used for making brushes in machines such as generators and motors.
3. Nitrogen is used in the manufacture of ammonia, nitric acid and fertilizers.
4. Nitrogen is used to preserve food materials.
5. Sulphur is used for making sulphuric acid, fungicides and in gun powders.
6. In vulcanization of rubber, non-metals sulphur is used.

Q5. What are amphoteric oxides?

Ans. Those metal oxides which show basic as well as acidic behaviour are known as amphoteric oxides. Aluminium metal and zinc metal form amphoteric oxides. Amphoteric oxides react with both acids as well as bases to form salts and water.

For example; when aluminium oxide reacts with acids as well as bases, it form salt and water such as when aluminium oxide reacts with hydrochloric acid to form aluminium chloride (salt) and water.



In this reaction aluminium oxide acts as basic oxide.

When aluminium oxide reacts with sodium hydroxide to form sodium aluminate (salt) and water.



In this reaction aluminium oxide acts as acidic oxide.

Q6. Explain the reactivity series of metals?

Ans. The arrangement of metals in a vertical column in the order of decreasing reactivities is called reactivity series of metals. In the reactivity series of metals, the most reactive metal is placed at the top whereas the least reactive metals is placed at the bottom. Since the metals at the bottom of the reactivity series are less reactive, so they usually found in free-state in nature. Hydrogen which is a non-metal is also placed in the reactivity series due to the fact like metals, hydrogen also loses electron to form positive ion H^+ . Some metals are more reactive and some are less reactive metals. Those metals which can lose electrons easily to form positive ions, are more reactive metals example

sodium. Those metals which lose electrons with difficulty to form positive ions are less reactive metals example copper.

The reactivity of the metals is as follows:



Q7. What are noble or inert gases? Explain why do metals and non-metals react?

Ans. The elements of group 18 of the periodic table are called noble gases or inert gases. These elements are Helium, Neon, Argon, Krypton, Xenon and Radon. These elements are named inert gases because they do not react with other elements to form compounds. These are chemically unreactive as they have stable electronic configuration and they do not have any valency. They are quite stable.

Metals and non-metals have unstable electronic configuration. They have some valency, that is, they have incomplete outermost shell. Metals and non-metals react in order to achieve the stable electronic configuration. An atom can achieve the stable electronic configuration in three ways:

- (i) By losing one or more electrons
- (ii) By gaining one or more electrons
- (iii) By sharing one or more electrons.

When metals react with non-metals, they form ionic compounds. When non-metals react with non-metals they form covalent compounds. Metals do not react with each other. The force which links the atoms in a molecule is called a chemical bond. By chemical bond, metals and non-metals achieve inert gas electronic configuration.

Q8. What is ion? Explain the formation of cation and anion?

Ans. An ion is an electrically charged atom (or group of atoms) which is formed by the loss or gain of electrons by the atom. So, an ion contains unequal number of electrons and protons. There are two types of ions. They are cation and anion.

Cation and its formation: A positively charged ion is called cation. Example sodium ion (Na^+) Cation is formed by the removal of electrons from an atom. If an element has less than 1-3 electrons in the outermost shell of its atoms, then it loses electrons in order to achieve inert gas configuration. And hence becomes positively charged ion called cation. Metals form cations.

For example; sodium has atomic number 11. So its electronic configuration is (2, 8,1). Its nearest inert gas is neon with electronic configuration (2, 8). So sodium has 1 electron more than neon atom. So sodium donates 1 outermost electron to achieve stable electronic configuration. And hence becomes cation i.e. sodium ion (Na^+).

Anion and its formation:

A negatively charged ion is called anion. Example chlorine ion (Cl^-)

Anion is formed by the addition of electrons to an atom. If an element has 5-7 electrons in the outermost shell of its atoms, then it gains electrons in order to achieve inert gas configuration. And hence becomes negatively charged ion called anion. Non-metals form anions.

For example; chlorine has atomic number 17. So its electronic configuration is (2, 8, 7). Its nearest inert gas is argon with electronic configuration (2, 8, 8). So chlorine has 1 electron less than argon atom. So chlorine accepts 1 electron to achieve stable electronic configuration. And hence becomes anion i.e. chlorine ion (Cl^-).

Q9. What is a chemical bond? Explain its types?

Ans. The force which links the atoms in a molecule is called a chemical bond. The chemical bond results in the formation of a compound. The cause of chemical combination is the tendency of the atoms to complete their octet (or duplet in case of lithium and hydrogen) so that they acquire the

stable nearest noble gas configuration. The chemical bonds are generally of two types:

1. Ionic bond
2. Covalent bond.

Ionic bond: The strong force of attraction developed between oppositely charged ions in a compound is called ionic bond. It is formed by transfer of electrons from one atom to another atom.

One atom can donate electrons to achieve the inert gas electron configuration and the other atom needs electron to achieve the inert gas electron configuration. The compound containing the ionic bond is called ionic compound. Thus, ionic compound is made of ions. When metals react with non-metals, transfer of electrons takes place metals to non-metals. Thus the bond between metals and non-metals is ionic bond. Examples; sodium chloride, magnesium oxide, etc. are ionic compounds and hence the bond between them is ionic bond.

1. **Covalent bond:** The chemical bond formed by the sharing of electrons between two atoms is known as covalent bond. The sharing of electrons takes place in such a way that each atom in the resulting molecule or compound gets stable electron configuration of an inert gas. In the formation of covalent bonds, atoms share only their outermost electrons. Whenever a non-metal combines with another non-metal, sharing of electrons takes place between their atoms and a covalent bond is formed. Covalent bond is of three types:

2. **Single covalent bond:** The covalent bond formed by the sharing of one pair of electrons between two atoms, each atom providing one of its outermost electrons is called single bond. For example the bond between H and Cl in HCl molecule.

3. **Double covalent bond:** The covalent bond formed by the sharing of two pairs of electrons between two atoms, each atom providing two of its outermost electrons is called double bond. For example the bond between O and O in O₂ molecule.

4. **Triple covalent bond:** The covalent bond formed by the sharing of three pairs of electrons between two atoms, each atom providing three of its outermost electrons is called triple bond. For example the bond between N and N in N₂ molecule.

Q10. What are ionic compound? Give properties of ionic compounds?

Ans. The compounds containing ionic bonds are known as ionic compounds. They are formed by the transfer of electrons from one atom to another. The ionic compounds are made up of positively charge ions called cations and the negatively charge ions called anions. The compounds formed when metals react with non-metals are ionic compounds. Some examples of ionic compounds are sodium chloride, potassium chloride, ammonium chloride, calcium oxide, copper sulphate etc.

PROPERTIES OF IONIC COMPOUNDS:

1. **Physical nature:** Ionic compounds are solids and hard because of the strong force of attraction between the positive and negative ions. These compounds are generally brittle and break into pieces when pressure is applied.

2. **Melting and boiling points:** Ionic compounds have high melting and boiling points. This is because a considerable amount of energy is required to break the strong inter -ionic attraction. For example melting point of NaCl is 1074 K and boiling point of NaCl is 1686 K.

3. **Solubility:** Electrovalent compounds are generally soluble in water and insoluble in organic solvents such as kerosene, petrol, etc.

4. **Conduction of Electricity:** The conduction of electricity through a solution involves the movement of charged particles. Ionic compounds in the solid state do not conduct electricity because movement of ions in the solid is not possible due to their rigid structure. But ionic compounds conduct electricity in the molten state. This is possible in the molten state because the ions move freely towards oppositely charged electrodes and conduct electricity.

Q11. Explain the formation of sodium chloride?

Ans. Sodium is a metal whereas chlorine is a non-metal. Sodium metal reacts with chlorine to form ionic compound, sodium chloride. It can be explained below:

The atomic number of sodium is 11, so its electronic configuration is 2, 8, 1. Sodium atom has only 1 electron in its outermost shell. So, the sodium atom donates 1 electron and forms a sodium ion, Na^+ .



The atomic number of chlorine is 17, so its electronic configuration is 2, 8, 7. Chlorine atom has only 7 electrons in its outermost shell and needs 1 more electron to achieve octet. So, the chlorine atom takes 1 electron and forms a negatively charged ion, Cl^- .



When sodium reacts with chlorine, it transfers its 1 outermost electron to the chlorine atom. By losing 1 electron, sodium atom forms a sodium ion Na^+ and by gaining 1 electron, the chlorine atom forms a chloride ion (Cl^-).

Sodium ion has positive charge whereas chlorine ion have negative charge. Due to opposite charges, sodium ion and chloride ion are held together by the electrostatic force of attraction to form sodium chloride, Na^+Cl^- .

Q12. What are covalent compounds? Give their properties?

Ans. The compounds containing covalent bonds are known as covalent compounds. Covalent compounds are formed by sharing of electrons between atoms. The covalent compounds are made up of molecules, so they are known as molecular compounds. The compound formed when two or more non-metals react is a covalent compound. Some examples of covalent compounds are hydrogen chloride, methyl bromide, carbon dioxide, etc.

PROPERTIES OF COVALENT COMPOUNDS:

- 1. Physical state:** Covalent compounds are usually liquids and gases. Only some of them are solids. This is because in covalent compounds weak force of attraction between their molecules is present. For example alcohol, benzene, ether, etc. are liquids, methane, chlorine etc. are gases. Glucose, cane sugar, etc. are solid covalent compounds.
- 2. Melting and boiling points:** Covalent compounds have usually low melting and boiling points. For example, naphthalene has a low melting point of 80°C and carbon tetrachloride has a low boiling point of 77°C .
- 3. Solubility:** Covalent compounds are usually insoluble in water but they are soluble in organic solvents. For example; naphthalene is insoluble in water but dissolves in organic solvents like ether.
- 4. Conduction of electricity:** The conduction of electricity through a solution involves the movement of charged particles. Covalent compounds are non-electrolytes. They do not conduct electricity because they do not have ions. However, some polar covalent compounds conduct electricity when dissolved in water.

Q13. Explain the formation of CH_3Cl ?

Ans. CH_3Cl is methyl chloride (or chloromethane). It is made up of one carbon atom, 3 hydrogen atoms and one chlorine atom. Carbon atom has 4 outermost electrons, each hydrogen atom has one outermost electron and chlorine atom has 7 outermost electrons. In order to achieve the stable configuration carbon has to gain or loss 4 electrons. But gaining or losing 4 electrons is very difficult. So it shares its outermost electrons with 3 hydrogen atoms and one chlorine atom to form CH_3Cl .



From the above electron –dot structure of CH_3Cl , there are four pairs of shared electrons between carbon and other atoms. Each pair of shared electrons constitutes one single covalent bond. So, CH_3Cl has four single covalent bonds. And hence CH_3Cl is a covalent compound.

OCCURRENCE OF METALS

Q14. (A) Explain how metals occur in nature?

Ans. The major source of metals is the earth's crust. Different metals have different reactivity. Depending on the reactivity, metals may occur either in native state or combined state.

Native State: Metals which are not attacked by the moisture, oxygen or carbon dioxide of air occur in the native state. There are only few metals which occur in native state. For example; gold, platinum etc.

Combine state: Most of the metals are quite reactive and hence do not occur as free elements in nature. Such metals are attacked by the moisture, oxygen or carbon dioxide of air and occur in the combined state in the form of compounds called minerals. Minerals are the compounds in which the metals occur in the earth's crust. Such metals are generally present as oxides, carbonates, sulphides, silicates etc. For example; Aluminium is found in the earth's crust as bauxite ($\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$) etc.

Q14. (B) Define the following terms:

Minerals: The natural materials or the chemical compounds in which the metals occur in the earth are called minerals.

Ores: Those minerals from which the metals can be extracted conveniently and economically are called ores.

All ores are minerals but all minerals are not ores

Gangue: The earth impurity that is found with the ores is called Gangue.

Q15. Explain the extraction of metals? Explain in detail its various steps?

Ans. The processes of obtaining the pure metals from their ores by removing impurities is called extraction of metals. The various processes involved in the extraction of metals from their ores and refining are known as metallurgy. The process to be used varies from metal to metal depending on various factors such as the type of ore used, type of impurity present and reactivity of the metal to be extracted. The three major steps involved in the extraction of the metals are:

1. Concentration of ores (or enrichment of ore)
2. Conversion of concentrated ore into metal and
3. Purification or refining of impure metal.

1 Concentration of ores: Ores which are obtained from the earth's crust are never pure. They are usually associated with impurities called gangue. The removal of these impurities from the ore is called concentration of ores and the process used to concentrate an ore is called the benefaction process. There are various benefaction processes such as hand picking gravity separation etc.

2 Conversion of concentrated ores into metals: In this method, metals in free-state are obtained from concentrated ores. Metals have been classified into three groups– metals of high reactivity, metals of medium reactivity and metals of low reactivity. However, different methods are obtained for extracting metals depending upon the reactivity of the metals. Extraction of metals actually involves the process of reduction of metal compound present in the ore.

3 Refining of metal: The metals obtained from the ores by various reduction processes are impure and are called crude metals. The impurities generally present are small amount of the metals, non-metals, unreacted oxides etc. Therefore, the crude metals are purified or refined. The method used for the purification depends upon the nature of the metal and the nature of the impurities to be removed. The most widely used method for refining of impure metals is electrolytic refining.

Q16. Explain the various methods of concentration of ores?

Ans. The various methods of concentration of ores are:

1. **Hand picking:** in case the impurities are quite distinct from the ore so that these may be differentiated by naked eye, these may be separated by handpicking.
2. **Hydraulic washing or Levigation or Gravity separation:** The process by which lighter earthy particles are freed from the heavier ore particles by washing with water is called levigation. For this purpose the ore is agitated with water. The lighter impurities are washed away while heavier ore particles settle down.
3. **Electromagnetic separation:** This method of concentration is employed when either the ore or the impurities associated with the ore are magnetic in nature. In this method, the powdered ore is dropped over a travelling belt moving around the roller— one of which has an electromagnet in it. As the ore particles roll over the belt, the magnetic particles are attracted by the magnetic roller. As a result two heaps are formed. The heap collected below the magnetic roller contains the magnetic particles while the heap formed away from the magnetic roller contains the non-magnetic particles.
4. **Froth floatation:** This method is based on the fact that the surface of sulphide ores is preferentially wetted by oils while that of gangue is preferentially wetted by water. In this method, the ore is mixed with water in a tank to form suspension and some pink oil is added to it along with froth stabilizer. The suspension is agitated by the rotating paddle which draws in air causing frothing. During this process, the ore particles which are preferentially wetted by the oil becomes lighter and thus rise to the surface along with the froth while the gangue particles are preferentially wetted by water become heavier and thus settle down at the bottom of the tank. The froth is skimmed off and finally dried to get the concentrated ore.
5. **Leaching:** In this process the powdered ore is treated with a suitable reagent which can selectively dissolve the ore but not the impurities. For example; pure aluminium oxide is obtained from the bauxite ore by treating it with strong solution of NaOH forming sodium meta-aluminate leaving behind impurities which are filtered off.



The solution of sodium aluminate is filtered, cooled and its pH adjusted by dilution



Aluminium hydroxide is filtered, washed and finally heated to about 1473 K to get pure alumina (Al_2O_3)



Q17. Explain the process of extraction of metals from concentrated ores?

Ans. Metals in free-state are extracted from concentrated ores by different methods depending upon the reactivity of the metals. Accordingly, metals have been classified into three groups— metals of high reactivity, metals of moderate reactivity and metals of low reactivity.

Metals of low reactivity: Metals of low reactivity are extracted from their ores by roasting alone. Roasting is the process of converting an ore into its metallic oxide by heating strongly in excess of air. This process is commonly used for sulphide ores.

For example; Mercury which is less reactive metal is extracted from its ore cinnabar (HgS) by roasting. First cinnabar is converted into mercury oxide and on further heating, it decomposes to form mercury metal.



Metals of moderate reactivity: Moderate reactive metals are found in nature in the form of oxide, Sulphide and carbonate ores. The processes used to extract such metals are calcination and roasting. First the ores are converted into their oxides and then by reduction of the oxides, metals are extracted.

Calcination is the process of converting an ore into its metallic oxide by heating strongly in limited supply of air. This process is used commonly to convert carbonate ores into their respective oxides.

For example; zinc occurs as zinc carbonate in calamine ore, $ZnCO_3$. Calamine is decomposed into zinc oxide and carbon dioxide by calcination.



After this, zinc metal is extracted by the reduction of its oxide with coke.



Roasting is the process of converting an ore into its metallic oxide by heating strongly in excess of air. This process is commonly used for sulphide ores

For example; ; zinc occurs as zinc sulphide in zinc blende ore, ZnS . Zinc blende is decomposed into zinc oxide and sulphur dioxide by roasting.



After this, zinc metal is extracted by the reduction of its oxide with coke.



Metals with high reactivity: The highly reactive metals are extracted by the electrolytic reduction of their molten chlorides or oxides. It is brought about by passing electric current through the molten salt. This process is called electrolysis.

For example; sodium metal is highly reactive metals is extracted by the electrolysis of molten sodium chloride. When electric current is passed through molten sodium chloride, it decomposes to form sodium metal and chlorine gas.



Molten sodium chloride contains sodium ions (Na^+) and chloride ion (Cl^-). When electric current is passed, sodium ions are attracted to cathode and takes electrons from cathode to form sodium metal. Chloride ions are attracted towards anode and gives electrons to anode and get oxidized to chlorine gas

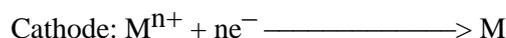


From the process, sodium metal is obtained.

Q18. Explain electrolytic refining of metals?

Ans. A large number of metals such as copper, silver, gold, lead, nickel etc. are refined by this method.

In this method, the impure metal (say copper) is converted into a block which forms anode while cathode is made up of a pure strip of the same metal. These electrodes are suspended in an electrolyte which is the solution of a soluble salt of the metal (say copper sulphate solution). When the electric current is passed, metal ions from the electrolyte are deposited at the cathode in the form of pure metal while an equivalent amount of metal dissolves from the anode and goes to into the electrolytic solution as metal ions. This process takes place as under:



. the net result is the transfer of pure metal from the anode to cathode. The impurities are therefore completely removed.

Q19 .What is Alloy?

Ans. An alloy is a homogeneous mixture of two or more metals or a metal and a non- metal.

→ Examples of alloy:

- (i) Iron: Mixed with small amount of carbon becomes hard and strong.
- (ii) Steel : Iron + Nickel and chromium



- (iii) Brass : Copper + Zinc
- (iv) Bronze : Copper + Tin (Sn)
- (v) Solder : Lead + tin
- (vi) Amalgam: If one of the metals is mercury (Hg).

ACIDS, BASES AND SALTS

CHAPTER: 5

Introduction

A wide variety of materials consists essentially of elements and compounds having different characteristics exist around us. Some of them are sour, some are bitter, while some are salty in taste. For Example - Sour and bitter tastes of food are due to acids and bases, respectively, present in them. Acids react with bases to produce salt whose properties are different from acid and base.

Q1. What is an acid? Give its physical and chemical properties?

The term "acid" is derived from the latin word "acidus" meaning sour to taste.

Example - Sour taste of lemon, unripened grapes, Vinegar, tomatoes etc.

According to Arrhenius theory:

Acids are substances which dissociate in aqueous solution to give hydrogen ions e.g, HCl, HNO₃, CH₃COOH and H₂SO₄ are acids because they give hydrogen ions when dissolved in water.

Physical properties of acids

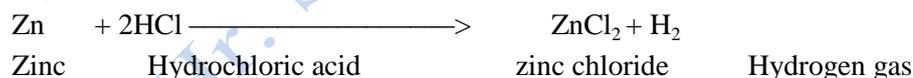
1. Acids have a sour taste.
2. Acids turn blue litmus red.
3. Acids turn methyl orange pink.
4. They conduct electricity and thus acts as electrolyte.
5. They have burning smell.

Chemical properties of acids:

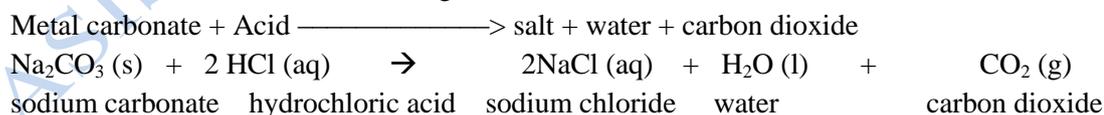
1 Reaction of Acids with metals: Acids react with metals to liberate hydrogen gas. The metal combines with the remaining part of the acids and forms a compound called salt. Thus, the reaction of a metal with an acid may be written as :



For example, reactive metals such as zinc and magnesium displace hydrogen from acids in the form of hydrogen gas.

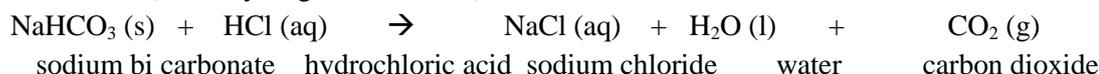


2 Reaction of acids with Metal carbonates and metal bicarbonates: Acids react with metal carbonates and metal hydrogen carbonates (also called bicarbonates) to form the respective salts, water, and carbon dioxide. Carbon dioxide gas is evolved with brisk effervescence.

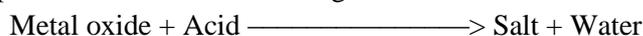


Similarly,

Metal bicarbonates (metal hydrogen carbonates) + acid \rightarrow salt + water + carbon dioxide



3 Reaction of metallic oxides with acids: Acids react with metallic oxides to form their respective salts and water. The general reaction between metal oxide and acid can be written as :

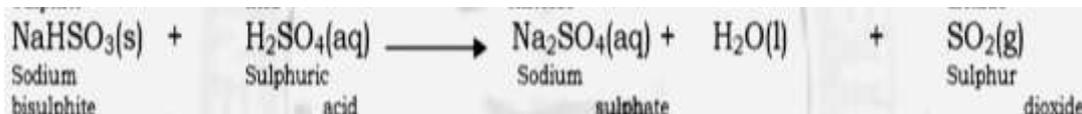
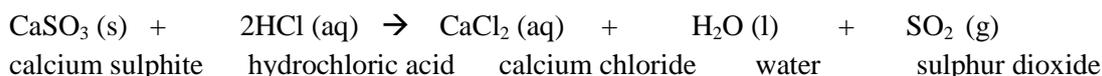


For example; when copper oxide reacts with hydrochloric acid, we get Copper (II) chloride and water.



4 Reaction of acids with sulphites and bisulphites: Dilute acids react with sulphites and hydrogen sulphites (bisulphites) to give sulphur dioxide as :





Q2. What is base? Give the physical and chemical properties of bases?

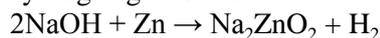
Ans. Bases are substances which dissociate in aqueous solution to give hydroxide ions. E.g, substances such as NaOH, KOH, Ca(OH)₂ etc. are bases because they give hydroxide ions when dissolved in water.

Physical properties of bases:

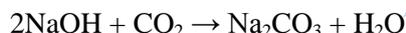
1. They have bitter taste.
2. Bases turn red litmus into blue.
3. They have slippery touch.
4. They have pH greater than 7.
5. They act as electrolytes.

Chemical properties of bases:

1. **Reaction of Bases with metals:** Certain metals such as Zinc, Aluminium, and Tin react with Alkali solutions on heating and hydrogen gas is evolved. For example, zinc reacts with sodium hydroxide and hydrogen gas is evolved. The reaction may be written as:



2. **Reaction of bases with non-metals:** Bases react with non-metallic oxides such as carbon dioxide to give salt and water. For example, sodium hydroxide reacts with carbon dioxide to form sodium carbonate and water as:

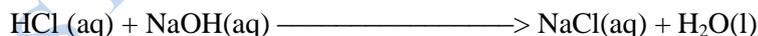


Q3. Explain neutralization reaction?

Ans. Acids and bases react with each other to give salt and water. In all acid-base reactions both acids and bases lose their character. In other words, their acidity and basicity is destroyed and therefore, such reactions are called neutralization reactions. In general, a neutralization reaction may be represented as:



For example, the reaction between hydrochloric acid and sodium hydroxide may be written as:

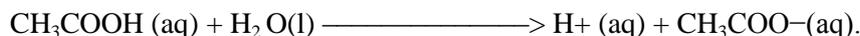


Q4. Explain the following terms:

Strong Acids:- The acids which are completely ionized in water are called strong acids. For example, hydrochloric acid (HCl), nitric acid (HNO₃), sulphuric acid (H₂SO₄) are strong acids because they are fully ionized in aqueous solutions. For example,



Weak Acids:- The acids which ionize to only a very small extent in water are called weak acids. For example, acetic acid (CH₃COOH), hydrocyanic acid (HCN), carbonic acid (H₂CO₃), phosphoric acid (H₃PO₄) are weak acids because they are only partially ionized in aqueous solutions. For example,



Strong Bases:- The bases which completely ionize to give hydroxide ions (OH⁻) are called strong bases. For example, sodium hydroxides (NaOH), potassium hydroxide (KOH), completely dissociate in aqueous solution and therefore, these are strong bases, water soluble bases are also called alkalis. For example,



Weak bases:- The bases which ionize to only small extent in water to give hydroxide ions (OH⁻) are called weak bases. For example, ammonium hydroxide (NH₄OH), calcium hydroxide {Ca(OH)₂} are weak bases because they only partially ionize in water. For example,



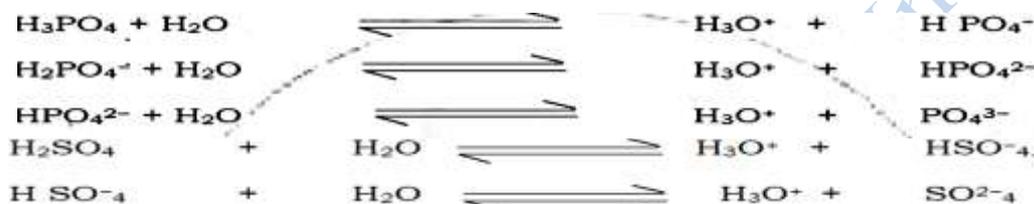
Q5. Give the classification of acids and bases?

Classification of acids: The acids are classified on the basis of number of hydrogen (H⁺) or hydronium (H₃O⁺) ions produced by the ionization of one molecule of the acid in aqueous solution. On the basis of basicity, acids are classified as:

1. Monobasic acids: Acids which when dissolved in water produce one hydronium ion per molecule of the acid are called monobasic acids. Thus, the basicity of monobasic acids is one. For example, HCl It dissociates in one step only as:



Since they have only one replaceable hydrogen atom, they form only one type of salts.



2. Dibasic acids. Acids which when dissolved in water produce two hydronium ions per molecule of the acid are called dibasic acids. Thus the basicity of a dibasic acid is two. For example, sulphuric acid (H₂SO₄) is a dibasic acid. It dissociates in two steps as:

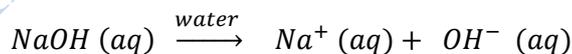
Since they have two replaceable hydrogen atoms, they form two types of salts.

3. Tribasic acids. Acids which when dissolved in water produce three hydronium ions per molecule of the acid are called tribasic acids. Thus, their basicity is 3. For example, phosphoric acid, H₃PO₄ is a tribasic acid. It dissociates in three steps in aqueous solution as:

Since they have three replaceable hydrogen atoms, they form three series of salt.

Classification of Bases: - on the bases of acidity, the base may be classified as:

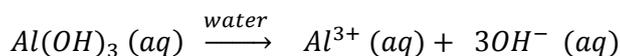
Monoacidic bases. Bases which when dissolved in water produce one hydroxide ion per molecule of the base are called monoacidic bases. For example, sodium hydroxide, Na OH is monoacidic base and its acidity is 1.



Diacidic bases. Bases which when dissolved in water produce two hydroxide ions per molecule of the base are called diacidic bases. For example, calcium hydroxide, Ca (OH)₂ is diacidic base and its acidity is 2.



Triacidic bases. Bases which when dissolved in water produce three hydroxide ions per molecule of the base are called triacidic bases. For example, aluminium hydroxide, Al(OH)₃ is triacidic base and its acidity is 3



What do All Acids have in Common?

A common thing for all the acids is that they produce hydrogen ions [H (aq.)] when dissolved in water.

For Example _ Acids like HCl, H₂SO₄ , HNO₃ , CH₃COOH etc. show acidic character because they dissociate in aqueous solution to produce hydrogen ions.

But all the compounds containing hydrogen are not acids such as glucose (C₆H₁₂O₆) and alcohol (C₂H₅OH) also contain hydrogen but they do not show acidic character because they don't liberate hydrogen ion in aqueous solution.



Q6. Explain pH scale?

Ans. The strength of an acid is a measure of its hydrogen ion $[H^+]$ concentration. In 1909; Sorensen suggested a new term for expressing the hydrogen ion concentration known as pH or pH scale. pH may be defined as a number by which negative power of 10 has to be raised in order to express the concentration of hydrogen ion of the solution in moles per litre.

$$[H^+] = 10^{-pH}$$

Where the concentration of H^+ ions is expressed as moles/litre and is written as $[H^+]$.

pH may also be defined as : Negative logarithm (base 10) of the hydrogen ion concentration in moles per litre.

Mathematically, it may be expressed as:

$$pH = -\log_{10}[H^+]$$

Since H^+ ions are always associated with water molecules, we may also write H_3O^+ for H^+ and hence pH may be expressed as : $pH = -\log[H_3O^+]$

On the pH scale, we may measure pH from 0 (very acidic) to 14 (very basic). The pH may simply be thought as a number which indicates the acidic or basic nature of the solution.

Q7. Explain pH of various solutions?

Ans. pH of a solution gives information regarding acidic, basic or neutral character of the solution.

1. pH of neutral solutions : Pure water is neutral. It has equal concentration of H_3O^+ and OH^- ions. It has been calculated that the concentration of both H_3O^+ and OH^- ions in a neutral solution or pure water are :

$$[H_3O^+] = 10^{-7} \text{ mol L}^{-1} \text{ and } [OH^-] = 10^{-7} \text{ mol L}^{-1} \text{ at } 298 \text{ K}$$

Therefore, pH of water or neutral solution is 7.

2. pH of basic solutions: All basic solutions have pH more than 7. In other words, whenever a solution has pH more than 7, it will be basic (or alkaline) in nature and it will turn red litmus blue. As the pH increases from 7 to 14, the basic character increases.

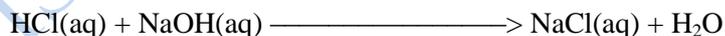
pH of acidic solutions: An acid solution having low pH value will be stronger acid than another solution having higher pH value. Solutions having pH between 0 to 2 are strongly acidic while those having pH between 5 to 7 are weakly acidic. The solutions having pH between 2 to 5 are moderately acidic.

Q8. What is a salt? What is the pH of salts?

Ans. A salt is a compound formed by complete neutralization of a base by an acid or an acid by a base.



For example,



A salt is an ionic compound which contains a positive ion (cation) other than hydrogen ion and a negative ion (anion) other than hydroxyl ion.

pH of Salts: The salts may be acidic, basic or neutral depending upon the acid or base from which they are formed. Therefore, the salts have different pH values.

In general,

- Salts of strong acids and strong bases are neutral with pH value of 7. E.g. NaCl, KNO_3 .
- Salts of strong acids and weak bases are acidic with pH values less than 7. E.g. $CuSO_4$, NH_4Cl .
- Salts of weak acids and strong bases are basic with pH value more than 7. E.g. Na_2CO_3 .

Q9. Explain the classification of salts?

Ans. The salts may be classified in the following ways:

- 1. Normal salts.** A normal salt is one which does not contain any replaceable hydrogen atoms in its molecule. These salts are generally formed by complete replacement of all the replaceable hydrogen atoms of an acid by a metallic or electropositive radical such as ammonium ion. For example, a normal salt sodium chloride (NaCl) is formed by replacement of hydrogen from hydrochloric acid by sodium metal.



Similarly, a normal salt sodium sulphate is formed by the replacement of both the hydrogen atoms of H_2SO_4 by sodium atoms.



2. **Acidic salts.** These salts formed by partial replacement of replaceable hydrogen ion are called acidic salts. These contain replaceable hydrogen ions. For example,

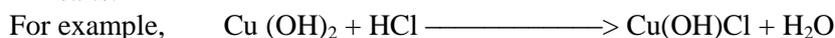


In this case, the metal sodium replaces only one hydrogen ion from sulphuric acid.

Therefore, acid salt ionizes in aqueous solution giving hydronium ion (H_3O^+) and hence gives all the properties of acids. For example,



3. **Basic salts.** The salts formed by the partial neutralization of a base by an acid are called basic salts.



4. **Mixed Salts.** The salts containing more than one cation or an-ion other than H^+ or H^- ions are called mixed salts. For example, bleaching powder, CaOCl_2 which contains two anions Cl^- and OCl^- .

5. **Double salts.** These salts are formed from two simple salts in their equimolar proportions, when they are slowly crystallized out from a mixture of their saturated salt solutions. For example, potash alum, $\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$ is obtained by mixing K_2SO_4 , and $\text{Al}_2(\text{SO}_4)_3$ in molar ratio in water solution followed by crystallization.

Q10. Explain common salt?

Ans. Common salt is a compound of sodium and chlorine.

Occurrence. Common salt is obtained mainly from the sea water. At some places it is mined from salt rocks.

Formula: Common salt is an ionic compound. Its simplest formula corresponds to NaCl . In fact, it exists as an aggregate represented by the formula $(\text{Na}^+\text{Cl}^-)_n$.

Properties:

- Common salt is deliquescent i.e., it absorbs moisture from the atmosphere. This is due to the presence of small quantity of magnesium chloride (MgCl_2) in it.
- Common salt is thermally very stable.
- Common salt is soluble in water. Its solubility increases with a rise in temperature.

Uses: Sodium chloride although cheap, but is very important chemical compound. It is used extensively for the following purposes:

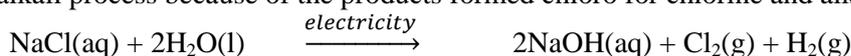
- Common salt is used for manufacturing a large number of useful chemical compounds such as caustic soda, soda ash (Washing soda), baking soda, hydrochloride acid, chlorine gas etc.
- Common salt forms an essential ingredient in our food.
- Common salt is used in freezing mixtures (Mixtures containing ice and solid granular common salt) producing low temperature.
- Common salt is used as a preservative for meat and fish
- It is used in the manufacture of soaps.

Manufacture Common salt is generally obtained from the sea water by evaporation method and is purified further before use.

Q11. Explain the following:

1. SODIUM HYDROXIDE:

Sodium hydroxide is manufactured by passing electricity through on aqueous NaCl is called the chloro-alkali process because of the products formed chloro for chlorine and alkali for sodium hydroxide.





During electrolysis, chlorine gas, Cl₂ is liberated at anode while hydrogen gas, H₂ is evolved at cathode. Sodium hydroxide solution is formed near the cathode.

Uses of sodium hydroxide:

- (i) Sodium hydroxide is used in the manufacture of soaps and detergents, paper, artificial silk and a number of chemicals.
- (ii) It is used in the petroleum refining.
- (iii) It is used in the purification of bauxite (ore of aluminium).
- (iv) It is used in the textile industry for making unshrinkable cotton fabrics.
- (v) It is used as cleansing agent for machines and metal sheets. It is also used for degreasing metals.
- (vi) It is used for the preparation of pure fats and oils.
- (vii) It is used for the preparation of artificial silk.

Properties of sodium hydroxide:

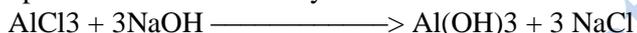
- i) Sodium hydroxide is a white crystalline, deliquescent solid.
- ii) It is readily soluble in water to give alkaline solution. It also neutralizes acids forming salt and water.



- iii) The crystals of sodium hydroxide are deliquescent i.e., they absorb moisture from air. On prolong exposure, sodium hydroxide absorbs CO₂ resulting in the formation of white crust of solid hydrated Na₂CO₃ at the surface.



- iv) Its aqueous solution is soapy to touch and has a strong corrosive action on the skin.
- v) An aqueous solution of sodium hydroxide contains large concentration of hydroxyl ion (OH⁻) and precipitates insoluble metal hydroxides from solutions containing metallic ions.



WASHING SODA:

Chemically, washing soda is sodium carbonate dec hydrate. The molecular formula of washing soda is Na₂CO₃.10H₂O, (Sodium carbonate dec hydrate). Commercially, anhydrous sodium carbonate (Na₂CO₃) is called soda ash.

Manufacture:

Sodium carbonate is manufactured by Solvay process (also known as ammonia soda process) as discussed below:

- (i) When carbon dioxide gas is passed through a brine solution (about 28% NaCl), saturated with ammonia, it gives sodium bicarbonate.



The participated sodium bicarbonate is filtered and dried. It is ignited to give sodium carbonate:



Uses of Washing Soda (or sodium carbonate).

Some important uses of Washing Soda are.

1. Washing Soda is used for washing clothes (laundry purposes).
2. Washing soda is used for softening hard water.
3. Sodium carbonate (soda ash) is used for the manufacture of detergents.
4. Sodium carbonate is used for the manufacture of many important compounds such as borax.
5. Sodium carbonate is also used in paper and paint industries.

Properties:

1. Sodium carbonate is a transparent crystalline solid. It exists as dehydrate (Na₂CO₃.10H₂O) containing 10 molecules of water of crystallization.
2. It is readily soluble in water. It dissolves in water to form an alkaline solution, which turns red litmus solution blue. This shows that an aqueous solution of sodium carbonate is alkaline.
3. Action of air: when crystals of washing soda are left open in air they lose nine molecules of water of crystallization and form a white powder of sodium carbonate monohydrate. This process of loss of water of crystallization from a hydrated salt to the atmosphere, on keeping it exposed to air is called efflorescence. Thus, washing soda is efflorescent.



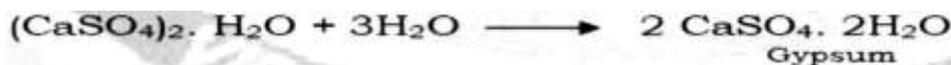
4. Action of heat. On heating, above 373K, washing soda does not decompose but loses all its



Properties:

1. It is a white powder.
2. It absorbs water with evolution of heat.

When mixed with water, it forms a paste which sets into a hard mass. This is called setting of Plaster of Paris. The setting of Plaster of Paris is due to its hydration into gypsum



Uses: Plaster of Paris is used for,

- i) Sealing air gaps
- ii) Making casts for statues, toys and decorative objects.
- iii) Plastering the fractured bones to keep the joints in a fixed position
- iv) Making black board chalks.

Water of Crystallization:

Water of crystallization is the fixed number of water molecules present in one formula unit of a salt. The water which combines chemically with the crystals of a salt and becomes part of it is called water crystallization. For example, five water molecules are present in one formula unit of copper sulphate, so the chemical formula of hydrated copper sulphate is $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. Similarly ten water molecules are present in one formula unit of washing soda. The chemical formula if hydrated salt is gypsum which has two molecules of water of crystallization, it has the formula $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$.

OASIS Hr. Sec. Educational Institute

OUR ENVIRONMENT

- **Environment:** The word environment is derived from French word; ‘environ’ meaning to encircle or to surround. It is defined as the physical or biological world where we live. It includes everything around the organism, i.e.; both non (abiotic) and living (biotic) components. The abiotic-components are the physical factors such as climatic factors (e.g. light, wind, temperature, humidity, etc.) and edaphic factors (eg, soil, texture, topography, pH, etc.) This interdependent interaction among organisms as well as with the abiotic components maintains a balance in nature.
- **Ecosystem:** The term “ecosystem” was proposed by A.G. Tansley in 1935. The term ecosystem comprises of two words,

“eco” and “system”- Eco meaning environment and system meaning particular way. The ecosystem means the particular way in which the environmental components are related to one another. Ecosystem may be defined as the structural and functional unit of biosphere comprising living and their non-living environment that interacts by means of food chains and chemical cycles resulting in energy-flow, biotic diversity and material cycling to form a stable, self-supporting system. There are two basic processes involved in an ecosystem:

I. Cycling of material: It is a cycle of exchange of materials between living beings and the environment to maintain continuous supply of the materials to living beings for stability of life on earth. These cycles are called biogeo-chemical cycles.

II. Flow of energy: The energy trapped by green plants from sun is passed on to the other organisms of the food chain.

- **Classification of Ecosystems:** In the biosphere, ecosystem may be classified on the basis of their nature, duration or size.

A. Nature: on the basis of nature, ecosystems may be classified as:

i. Natural ecosystem: These ecosystems operate in the nature by themselves without any human interference. For example a pond, a lake, a meadow, etc. on the basis of kind of habitat it provides to the organisms, natural ecosystems are of two types:

a) Aquatic ecosystem: It is the type of ecosystem in which habitat is provided by water. For example: sea, rivers, lake etc. On the basis of salinity, aquatic ecosystem is further divided into three types:

1. Fresh water ecosystem: It is the type of ecosystem in which salinity is low. For example: ponds, lakes, etc. On the basis of its state i.e either standing or moving, fresh water ecosystem is of two types:

- **Lotic ecosystem:** It is the type of ecosystem in which water is moving. For example: ponds, streams, etc.
- **Lenetic ecosystem:** It is the type of ecosystem in which water is standing. For example: ponds, lakes, etc.

2. Marine water ecosystem: It is a type of aquatic ecosystem in which salinity is high. For example: oceans.

3. Estuarine water ecosystem: It is a type of aquatic ecosystem which is formed by intermixing of fresh water and marine water. It has salinity within a range of 0.5-3.5%.

b) Terrestrial ecosystem: Habitat provided by land is termed as terrestrial ecosystem. It varies greatly in climatic and biological terms. The desert, grassland and mountains represent the terrestrial ecosystems. It is of three types:

Grassland, Desert and Forest.

ii. Artificial ecosystem: These are maintained by man and hence are also called man-made or man-engineered ecosystems. In these ecosystems, man maintains or disturbs the natural

balance. For example: croplands, gardens, aquarium etc.

B. Duration: On the basis of duration, ecosystems are classified into two types:

- i. Temporary ecosystem:** These are short-lived ecosystems which maybe natural or man-made. For example rain fed pond, laboratory culture of protozoans etc.
- ii. Permanent ecosystem:** These are self-supporting natural systems that maintain themselves for relatively long duration. For example: a lake, forest, desert, etc.

C. Size: On the basis of size, ecosystems are classified into 2 types:

- i. Small ecosystems:** These are also called micro ecosystems. For example: a flowerpot, etc.
- ii. Large ecosystems:** Very large sized ecosystems are also called as macro ecosystems. For example: oceans, forests, deserts, etc.

• **Components of an ecosystem:** Every ecosystem has two main components:

(i) Abiotic components: These are non-living physio-chemical components of an eco-system.

a) Climatic factors: These include water, sunlight, temperature, humidity, rainfall, wind and edaphic factors like soil, topography, minerals, pH, etc.

b) Inorganic substances: These include carbon, nitrogen, oxygen, sodium, potassium, calcium, phosphorous, etc. and their compounds (e.g. water, CO₂). These occur either in free state in air or dissolved in water in the soil.

c) Organic compounds: These include carbohydrates, proteins, lipids, nucleic acids etc. These are present in living organisms and dead organic matter.

(ii) Biotic compounds: It is a community of living organisms (plants, animals, and microbes). These organisms fall into three nutritional groups.

A. Producers; they are photosynthetic or autotrophic plants which are able to synthesize organic food such as starch from inorganic substances, carbon-dioxide and water in presence of chlorophyll and sunlight. They convert solar energy into chemical energy so are also called as transducers.

For example: green plants, blue-green algae, higher plants etc.

• **Importance of producers:**

- _ All organisms depend upon producers for food.
- _ They pick up carbon dioxide from the atmosphere and release oxygen during the process of photosynthesis.
- _ Producers maintain the CO₂-O₂ balance in nature.

B. Consumers: They are the animals which feed on organic food, prepared by auto-trophs. They are differentiated into 3 categories:

i. Herbivores: They obtain their food and energy directly from green plants. They are also called as first order consumers or primary consumers. As the herbivores feed on plants, or plant products and convert them into animal matter, they are often called key industry animals. For example: rabbit, squirrel, cows, deer, goat, etc.

ii. Carnivores: They ingest or prey upon other animals. The carnivores feed on primary carnivores or secondary consumers. For example: cats, fox, lion, tiger.

iii. Tertiary or third order consumers: These are larger carnivores which feed on primary carnivores (secondary consumers). For example: large fish, water birds, snakes, wolves, etc.

iv. Quaternary or 4th order consumers: These are even larger carnivores which feed on secondary carnivores (tertiary consumers). For example: tigers, lions, hawks, sharks etc. In any food chain, the consumer present at the end of the chain is called Top Carnivore.

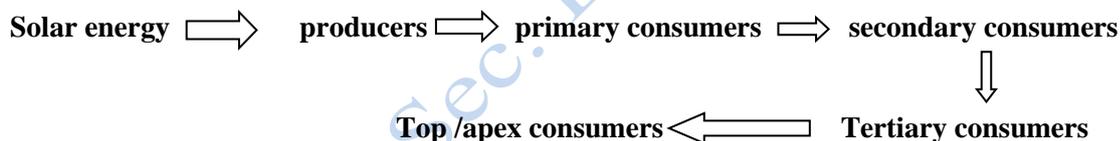
➤ **Importance of consumers:**

- _ They provide the biological control over the population of producers to different levels of consumers.
- _ Many consumers help the producers in pollination and seed dispersal.

C. Decomposers and Transformers (Reducers): They are saprophytic micro-organisms which feed on dead bodies of organisms and organic wastes of living organisms. For example: certain bacteria

and fungi. They break down the complex organic compounds present in the dead organisms into simpler substances. The simple small organic molecules are utilized by decomposers themselves and inorganic substances are released into the environment for re-use as raw materials by the producers.

- **Transformers:** There are special groups of bacteria which disintegrate the simple organic substances into inorganic forms that are suitable for reuse by producers.
- **Importance of Decomposers:**
 - _ Decomposers help in decomposing the dead bodies of plants and animals, and hence act as cleaning agents of environment.
 - They create space for the newer generation of organisms.
 - _ They return the chemical nutrients to the environment by decomposing the dead bodies of plants and animals.
 - _ They maintain the fertility of soil.
 - **Functions of Ecosystem:** Ecosystem regulates the equilibrium of the nature by maintaining a cyclical pathway for exchange of materials as:
 - i. Solar energy is trapped by auto-trophs.
 - ii. The auto-trophs prepare organic food constituents with the help of solar energy by taking raw material from the environment.
 - iii. These organic materials are used by hetero-trophs.
 - iv. Some of the materials are returned to the environment in the form of excreta while the rest is returned to environment when they die.
 - v. The dead organism is decomposed by a certain group of organisms called decomposers.
 - **Food chain:** In the environment, food relationships exist between living organisms. They interact with one another for their food preparation as well as for food consumption. Some organisms consume other organisms and they are in turn consumed by others thereby forming a chain. In this chain, energy transfer takes place and it is called food chain. A food chain can be defined as: “the sequential interlinking of organisms involving transfer of food energy from producers through a series of organisms with repeated eating and being eaten, is called food chain.



- **Length of food chain:** In an ecosystem, different food chains may have 2,3,4 or maximum of 5 trophic levels. Accordingly a food-chain may end at the:

- a) Herbivore level
- b) Primary carnivore level
- c) Secondary carnivore level
- d) Tertiary carnivore level
- e) Quaternary level

First trophic level in all food chains will be the producers.

- **Types of food chains:**

i. Grazing food chain: It begins at the producer level and extends up to top carnivores. Usually the size of the consumer is comparatively large at successive levels. For example:

a) In a forest



b) In a garden



ii. Parasitic food chain: It begins with the producer level. Here the consumer is smaller in size. Passing of energy from larger to smaller organism is a typical feature of this food chain. A larger organism from where the food is derived is called host. Smaller organism which obtains food is called the parasite.

iii. Saprophytic food chain: Some animals regarded as top carnivores like hawk, vulture has no natural food enemy. They are seldom killed yet their dead bodies are acted upon by decomposers. The transfer of food energy from dead organic matter of decaying animal and plant bodies to micro-organisms is known as saprophytic food chain.

➤ **Characteristics of Food chain:**

1. A food chain involves a nutritive interaction between the living organisms of an ecosystem. In a food chain there occurs repeated eating i.e. each group eats the other group and subsequently is eaten up by some other group of organisms.
2. A food chain is always straight and proceeds in a progressive straight line.
3. There is unidirectional flow of energy from sun to producers and subsequently to series of different types of consumers.
4. Food chains usually have 3 or 4 trophic levels. However 5th trophic level may also exist.
5. Some organisms are omnivores. They occupy different trophic positions in different food chains.
6. At each transfer, generally 80-90% of energy is lost as heat in accordance with second law of thermodynamics.

➤ **Significance of food chain:**

- The study of food chains helps in understanding various organisms in an ecosystem.
- The food chains transfer energy and materials between various living components of an ecosystem or biosphere.
- The food chain makes ecosystem/biosphere dynamic.
- The movement of toxic substances like pesticides, weedicides, etc. through food chains can prove harmful as they enter the bodies of organisms and go on concentrating at each trophic level. This is called biomagnifications.

➤ **Food web:** The various food chains operating within an ecosystem or the biosphere cannot function in isolation. Many of these food chains are interconnected by organisms which are a part of more than one food chain. Thus various food chains form a network with interconnections and linkages. This interlocking of several food chains is called Food web.

In a food web, one organism may occupy position in more than one food chain. An organism can obtain its food from different sources and in turn may be eaten up by different types of organism. For example: a rat may be consumed by a snake or an eagle. Similarly a grasshopper may be consumed by a frog, an eagle or a bigger insect. This food web has seven interconnected food chains. These are as:

- Plant → Rabbit → Eagle
- Plant → Rat → Eagle
- Plant → Rat → Snake
- Plant → Seed eating bird → Eagle
- Plant → Grasshopper → Eagle
- Plant → grasshopper → Frog → snake → Eagle
- Plant → Grasshopper → Bigger insect → Frog → Eagle → Snake

• **Characteristics of food web:**

1. Food webs are never straight. Instead, each food web is formed by interlinking of food chains.
2. A food web provides alternative pathways of food availability.
3. Greater alternatives available in a food web makes the ecosystem more stable.
4. Food webs also help in checking the over population of highly fertile species of plants and animals.
5. Food webs also help in ecosystem development.

• **Flow of energy in an Ecosystem:**

- Each organism needs energy to perform all life processes, for building up and repairing the body tissue.
- The ultimate source of all the energy used by living organisms is sun.
- Of the total solar radiation falling on earth only about 1% is captured by green plants in a terrestrial ecosystem and converted into food. The plants store it as chemical energy of food. The plants utilize part of this stored energy for their metabolic activities. During metabolic processes, some energy is released in the environment as unusable heat.

- The amount of available energy goes on decreasing at each trophic level, food chains usually consists of three to four steps.

How do Organisms Reproduce

Reproduction: It may be defined as the production of new generation of individuals of same species that are physically independent of their parents.

The off spring grows, matures and produces new off springs. Reproduction therefore ensures continuity of life of species on earth.

Features of reproduction:

- Synthesis of RNA and proteins.
- Replication and copying of DNA
- Cell division
- Formation of reproductive units
- Development of reproductive units

Reproduction is an energy spending process which is not essential to maintain the life of an individual organism. However it provides 'group immortality' by replacing dead individuals with new ones for survival on earth.

Types of reproduction:

Reproduction is of two types

- Asexual reproduction
- Sexual reproduction

Sexual reproduction: It may be defined as the production of off springs(new individual) by fusion of two gametes, one from male parent and other from female parent to form a diploid zygote, which then develops into mature organisms.

Sexual reproduction involves the process of fertilization.

Fertilization: it may be defined as the fusion of nuclei of male gamete (sperm, pollen grains) with female gamete (egg cell or ova) to form a single diploid cell called zygote.

Fertilization is of two types:

Internal fertilization	External fertilization
<ul style="list-style-type: none"> • It occurs inside the body of a female (i.e. fusion of male and female gametes takes place within a body) • After internal fertilization, egg will come out of body having a thick shell. • It does not need water as medium. • Organisms involved have immobile male gametes. • Wastage of gametes is lower in fertilization. • Survival rate of organisms is high. • E.g. hen, human beings etc. 	<ul style="list-style-type: none"> • In this, fusion of sperm and egg occurs externally of the female body. • In external fertilization eggs are produced with thin tertiary membrane or without membrane. • It needs water as medium. • Organisms involved have mobile gametes with flagella. • Wastage of gametes is higher. • Survival rate of organisms is low. • E.g. fish, amphibians etc.

Important points:

- Organisms including human beings have separate male and female individual may be male or female. Such organisms are called 'unisexual'
- Some plants are also unisexual e.g, Cucurbits, papaya etc.
- Majority of flowering plants and few animals (e.g. tapeworm, garden snail, starfish etc.) are bisexual or hermaphrodite i.e each individual has both male and female sex organs.
- Sexual reproduction involves meiosis- reducing chromosome number by half to ensure production of diploid number of chromosomes in zygote on fusion of gametes.

Sexual reproduction in plants:

In flowering plants, all steps of sexual reproduction occur within specialized reproductive organs called flowers. In angiosperms (flowering the plants), a flower is a part of shoot modified for sexual reproduction. Flowers are arranged in rings or circles called whorls, attached on receptacle.

The four whorls of floral appendages are:



- Calyx or sepals.
- Corolla or petals.
- Androecium or stamen.
- Gynoecium (pistil) or carpel.
 1. **Calyx or sepals:** the outer most whorl of floral leaves is call sepals. Sepals resemble like small leaves and they protect flower in the bud.
 2. **Corolla or petals:** petals are large, showy, brightly colored part of the flower. Petals attract birds and insects for pollination. Petals also protect the reproductive parts of the flower like anther.

Calyx and corolla are no essential parts of the flower as they aren't involved in process of reproduction

 3. **Androecium or stamen:** it consists of stamen- the male reproductive part. Each stamen consists of anther and filament.
The filament is a long stalk that bears anther at top. Anthers are bilobed structures, containing four pollen sacs called microsporangia. Each pollen sac has a no. of microspore mother cells. Meiotic division takes place in mother cells resulting in formation of pollen grains.
Pollen grains are haploid microspores. Initially each microspore is uni- nucleate but soon it becomes two- three nucleated.
The two male nuclei along with cytoplasm differentiate into gametes. Thus each pollen grain produces two male gametes, which germinate to produce pollen tube.
 4. **Gynoecium or pistil:** it contains carpel- the female reproductive part. Carpel is present in the center of a flower. It is divided into three parts:
 - The swollen bottom part is ovary.
 - Middle elongated part is style.
 - The terminal part is sticky stigma

Inside ovary is an embryo sac- ovule enclosing egg apparatus containing :

- One haploid egg cell
- Two synergid cells- which guide pollen tube to recognize egg cell.
- Two polar nuclei- i.e two haploid nuclei in center
- Three antipodal cells- nutritive cells which help in nourishment of embryo sac.

Pollination: the transfer of pollen grains from the opened anther of stamen to the receptive stigma of carpel is called pollination. Pollination is important process by which pollen grains are transported to stigma of a flower, facilitating process of fertilization. The pollen grains protect male gametes from dying out. The common agents of pollination are : wind, water, insects , birds and many living organisms.

Pollination is of two types:

- **Self-pollination:** if the transfer of pollen grains from anther to stigma occurs in same flower or another flower of same plant, it is called self – pollination.

It doesn't require external agency for transfer of pollen grains.

- **Cross pollination:** it involves the transfer of pollen grains from flower of one plant to stigma of flower of another plant of same species.

It does require external agency.

Fertilization in plants:

Pollination results in transfer of pollen grains to stigma of a carpel. There they absorb, water and nutrients; swell and then germinate to produce pollen grains.

- The pollen tube grows into stigma, passes through style to move towards ovarian cavity.
- Two non-motile male gametes are produced inside pollen tube.
- After reaching to ovary, the pollen tubes enter ovule through a tip called micropyle.
- The tip of tube finally pierces the egg apparatus and of embryo sac releasing two male gametes.

- During the act of fertilization, one male gamete fuses with haploid egg cell to form diploid single cell called zygote. This process is called syngamy or fertilization.
- The diploid zygote finally develops into an embryo. The other male gamete fuses with two polar nuclei to form triploid (3N) primary endosperm nucleus. This process is called triple fertilization.
The process involving two acts of fertilization inside embryo sac is called double fertilization.
- After fertilization
 - Zygote develops into embryo
 - Ovule into seed and,
 - Ovary into fruit

Reproduction in human beings:

Organisms that reproduce sexually involve production of sex cells called gametes. In humans, male sex cells i.e. sperm are relatively motile. Female sex cells – ova or egg cells are non-motile and larger than sperm. When these cells fuse during fertilization, the resulting cell – zygote contains inherited genes from father and mother.

Puberty: it is the age or period, when a reproductive organ of a child starts functioning i.e. produce gametes and sex hormones, and as a result the child attains sexual maturity.

- ❖ In males puberty is triggered by secretion of testosterone from testes – resulting in development of secondary sexual characters
- ❖ In females, puberty is triggered by secretion of estrogen from ovaries for development and maturation of reproductive tract as well as development of secondary sexual characters.

Secondary sexual characters in males:

- ❖ Enlargement of penis and scrotum
- ❖ Broadening of shoulders and muscle development
- ❖ Enlargement of larynx, thickening of vocal cords producing deepening of voice
- ❖ Growth of pubic hair, extra hair on face, in armpits and on chest.
- ❖ Increased height
- ❖ Change in behavior regarding mating.

Secondary sexual characters in females:

- ❖ Growth of breast and external genitalia (vulva)
- ❖ Growth of pubic hair and extra hair in arm pits.
- ❖ Broadening of pelvis.
- ❖ Initiation of menstruation and ovulation.
- ❖ Increase in sub cutaneous fat, particularly in thighs, shoulders, buttocks and face.

Male reproductive system:

It consists of

- a) Testes
 - b) Scrotum
 - c) Vas deferens
 - d) Urethra
 - e) Penis
- A. **Testes (sing. Testis):** the human male possesses a pair of testes, which are the primary reproductive organs, lying outside the abdominal cavity, descending into scrotum. The two testes are the male gonads, producing male gametes called sperms.
The testes also produce male sex hormones called testosterone.
 - B. **Scrotum:** it is a deeply pigmented pouch of skin that hangs between the legs. It is divided internally into right and left scrotal sacs by a muscular partition. The two testes lie in respective sac.

Scrotum acts as a thermoregulator, providing optimal temperature for sperm formation which develops at 3^o C lower than normal body temperature.

The life of sperms is highly reduced at higher temperature. However during winters, the

scrotum shrinks to bring testes close to body to get warmth.

- C. **Vas deferens:** sperm duct is also known as 'vas deferens'. They are two in number; each one arising from testis placed on either side vas deferens is a straight tube, about 40 cm long, which carries sperms to seminal vesicle. The sperms are stored temporarily in seminal vesicles where secretions like mucus, proteins, watery alkaline fluid containing fructose from various glands mix with sperms to form thick liquid called semen.
- D. **Urethra:** it is about 20 cm long tube that arises from urinary bladder, forming a common passage for the sperm and urine. It runs through penis and opens to outside through male genital pore. The contents of seminal vesicles i.e. sperms from vas deferens also form urethra.
- E. **Penis:** penis is a long and thick muscular organ made up of mostly erectile tissue. The tip of penis consists of a soft and highly sensitive glans penis which is covered by a loose retractable fold of skin called fore-skin.

At the time of sexual excitement, the erectile tissues get filled with blood causing penis to become erect. It is then inserted into vagina of female for ejaculation of sperms.

Female reproductive system:

Female reproductive system is more complex than that of males as it has to accept sperms from males, support the movement to egg, leading to post fertilization changes. It consists of

- ✓ Ovaries
- ✓ Fallopian tube
- ✓ Uterus
- ✓ Cervix
- ✓ Vagina

- A. **Ovaries:** each human female contains two almond shaped ovaries, located in lower part of abdominal cavity, near kidney. Each ovary is connected to uterus by a ligament. The ovaries are primary female gonads, having two functions:
- Production of ova
 - Secretion of female sex hormones
 - a) Estrogen – helps in maturation of ova and triggers puberty
 - b) Progesterone – required for formation of placenta and maintenance of pregnancy.

Each ovary contains ovarian follicles which is a fluid filled sac containing immature egg or oocyte. During ovulation, mature egg called ovum is released from follicle at puberty. **Usually one ovum is produced during fertile years of women.**

After menopause, the ovaries become small and loose follicles.

- B. **Fallopian tube:** also called 'oviduct', it is 10-20 cm long, muscular tube whose function is to convey ovum from ovary to uterus. It is done by peristalsis. Fertilization of ovum generally takes place in upper portion of fallopian tube.

The funnel shaped opening end of each fallopian tube lies near the posterior ends of each ovary while other end of long convoluted tubule opens into uterus.

- C. **Uterus:** it is a large, hollow, muscular, inverted and pear shaped structure that lies behind the bladder. If fertilization takes place, the embryo gets attached to the wall of uterus and grows there until birth.
- D. **Cervix:** it is located at the top of vagina, acting as junction between vagina and uterus.
- E. **Vagina:** it is a tube about 10 cm long, whose walls contain elastic tissues, and extends from cervix to outside of the body. It provides passage for menstrual flow, serves as receptacle for sperm during intercourse, and forms a part of birth canal during labour.
- F.

In females, the urinary opening and vaginal openings are separate.

Menstrual cycle : the cycle of events taking place in females reproductive organs i.e. in ovaries and uterus, under the control of sex hormones, in every 28 days and marked by bleeding or menstrual flow is called menstrual cycle in human females. However variation from 24 to 35 days is very common.

The cycle starts between 12 and 15 years and continues until about 45-50 years and in rare cases

till 55 years of age.

It is regulated by hormones secreted by pituitary gland. The pituitary gland is stimulated by releasing factors produced in Hypothalamus.

The hormones produced by pituitary gland influence ovaries and ovaries show effect on the wall of uterus.

The Menstrual cycle is divided into three phases:

- ❖ **Menstrual or bleeding phase:** this phase lasts about four days in a 28 day cycle. The production of “leutinizing hormone” from pituitary gland is considerably reduced. The withdrawal of this hormone causes degeneration of Corpus luteum of ovaries and therefore ‘progesterone hormone’ secretion is reduced from ovaries.

The endometrium of uterus breaks down and menstruation begins. The cells of endometrium secretions, blood and unfertilized ovum constitute menstrual flow.

- ❖ **Proliferative phase:** this phase lasts for about 14 days in a 28 day cycle. The follicle stimulating hormone (FSH) secreted by pituitary gland stimulates ovarian follicles to secrete oestrogen.

Oestrogen stimulates proliferation of endometrium of uterine wall. The endometrium becomes thicker by rapid cell multiplication and this is accompanied by increase in uterine glands and blood vessels.

This phase ends when ovarian follicle ruptures and ovulation occurs and at the same time the production of oestrogen stops.

- ❖ **Secretory phase:** this phase lasts for about 10 days in a 28 day cycle. The Leutinizing hormone causes ovulation. The remaining cells of ovarian follicles are stimulated by Leutinizing hormone to develop Corpus Luteum. The latter secretes progesterone.

Progesterone stimulates uterine glands to produce increased amount of watery mucus. During this phase, there is also increase in secretion of watery mucus by vaginal glands and glands of fallopian tube.

After secretory phase, the menstrual phase begins.

Process of fertilization: it includes

- I. **Fertilization:** the fusion of sperm nucleus with egg nucleus to form a diploid zygote is called fertilization. This is achieved by copulation, the human male with the help of penis releases gametes in female genital tract. This is called ejaculation

The sperms are deposited at the top of vagina close to cervix of uterus. The sperms being highly active and mobile travel upwards through uterus to reach to fallopian tube within five minutes. In oviduct, undergoing several chemical changes one sperm fertilizes ovum, forming zygote.

Fertilization occurs only when copulation occurs during ovulation period. It is marked by stoppage of menstrual flow, being earliest sign of pregnancy.

- II. **Implantation:** about 6-9 days after fertilization, the fertilized egg (zygote) descends from fallopian tube into uterus. During its movement towards uterus, the division of zygote starts.

On contact, the zygote will attach itself to uterine wall, usually in upper part of uterus. The inner wall of uterus develops and partially envelops the embryo. This process is called implantation. The fertilized egg (zygote) is called embryo, as soon as it implants, which is around 7 to 10 days after fertilization. It continues to be called an embryo till week 8.

The lining of uterus becomes thick and is highly supplied with blood to nourish growing embryo. The embryo gets nutrition from mother’s blood with the help of a special tissue called ‘placenta’ – a disc embedded in uterine wall.

Placenta contains villi on embryo’s side of tissue. On mother’s side are blood spaces, which surround villi. This provides large surface area for glucose and oxygen to pass from mother to embryo. The developing embryo will also generate waste substances which can be removed by transferring them into mother’s blood through placenta.

A woman with an embryo or fetus developing in her uterus is called pregnant and physical condition as pregnancy.

- III. **Gestation period:** the period during which embryo development takes place in uterus is called gestation period. The development of child inside mother’s body takes place within nine months.

- IV. Birth:** few days before birth, the fetus moves in the uterus until its head points towards the cervix. The child is born as a result of rhythmic contractions of muscles in uterus. Contractions of muscular uterine wall force the fully grown fetus through cervix into vagina and due to repeated contractions an infant is born. This process is called parturition.

Population control:

The regulation of conception by preventive measures or devices to control the number of offsprings is called birth control.

The methods of birth control which deliberately prevent fertilization are called contraception. These methods include:

- ❖ **Barrier method:** these are physical devices to prevent entry of sperm in female genital tract during copulation. They also protect from sexually transmitted diseases and include
 - Condoms – rubber sheath used by man
 - Femidom – poly urethane tube used by females
 - Cervical cap – used by females.
- ❖ **Chemical methods:** foam tablets, jellies, pastes, creams and spermicides are common chemicals used by females. These include:
 - Oral pills: these pills prevent development of egg and ovulation by inhibiting secretion of Follicle Stimulating hormone by acting on ovaries, pituitary gland and hypothalamus.
 - Vaginal pills: these pills contain spermicides and are used by women before copulation.
- ❖ **Intrauterine conceptive devices:**
These are made of copper, plastic or stainless steel, inserted into uterus by a practitioner. However, drawback with these devices is bleeding and discomfort.
- ❖ **Surgical methods:** such methods are safe in long run but they may cause infections and other problems, if not done properly. These include:
 - a) Vasectomy: it is performed in males by removal of a small portion of vas deferens by surgical operation. The two cut ends are then tied with threads. This prevents sperm from coming out.
 - b) Tubectomy: this is done in females involving removal of small portion of fallopian tubes by surgical operation. The cuts are then tied with threads. It prevents the egg to enter the fallopian tube.

Sexually transmitted diseases:

The infectious diseases, which are spread from an infected person to healthy person by sexual contact are called sexually transmitted diseases. These diseases are also called as Venereal disease. These diseases are caused by bacteria, viruses and protozoa. Some of the diseases included are:

- ❖ **Gonorrhoea:** it is caused by a bacterium '*Nisseria gonorrhoea*'. The victim feels burning sensation and pain during urination. The disease causes inflammation of mucous membrane of urinogenital tract, rectum, throat and eye. There may be discharge of pus from penis and excessive secretion from vagina. The disease is easily curable by use of antibiotics.
- ❖ **Syphilis:** it is caused by bacterium '*Treponemapallidum*'. The disease is chronic illness which affects mucous membrane in genital tracts, rectal and oral regions causing lesions.

Infection occurs by sexual contact and even by kissing or close body contact. However is easily curable by antibiotics.

- ❖ **Acquired Immunodeficiency Syndrome:** it is caused by HIV- Human Immunodeficiency Virus.

It affects the body's self-defense mechanism – immune system

The major symptoms of disease are

- Damage to brain
- Unexplained fever and loss of appetite
- Weight loss
- Chronic diarrhoea, cough, night sweats

- Shortness of breath and may result in death

The disease functions in two ways:

- ✓ Malignant tumours in connective tissue
- ✓ Viral, bacterial and fungal infections of any body system.

AIDS is spread by

- Unprotected sex with infected partner
- Use of contaminated needles and syringes to inject drugs or vaccines.
- Transfusion of infected blood or blood products.
- Use of contaminated razors for shaving.

Child bearing and women's health:

The women's health is backbone of every family, society and nation. Early marriage before 21, however is a major cause for frequent child bearing, which brings in abnormalities in brain development as mother isn't mature enough to conceive. Pregnant women should be kept free from any stress on account of family or financial problems. Following points should be kept in mind:

- ✓ Would be mothers should not take heavy doses of such medicines which aren't allowed during pregnancy.
- ✓ Cigarette smoking, LSD, drugs should be avoided as it causes harmful effect on fetus.
- ✓ A very high level of drinking alcohol during pregnancy can cause fetal syndrome including mental retardation.

Asexual reproduction

It may be defined as the production of offspring's by a single parent without meiosis, formation of gametes, fertilization and transfer of genetic material between individual.

It occurs mostly in unicellular organisms (like bacteria, protozoans etc.) Some plants (like algae, fungi, bryophytes etc.) and certain multicellular animals (like sponges, hydra).

In this method of reproduction, following repeated mitotic divisions, the young ones receive genes from a single parent.

Asexual reproduction involves:

- **Fission:** it may be defined as the splitting of a unicellular organism into two or more than two daughter cells.

Fission is of two types:

- 1) **Binary fission:** in this type of fission, a parent cell divides into two small, nearly equal sized identical daughter cells.
 - Firstly the nucleus divides and forms two daughter nuclei.
 - Then cytoplasm in mother cell divides into two daughter cells, with each daughter cell having a nucleus and own cellular apparatus, which then develop into an adult organism. E.g. Amoeba, Paramecium etc.
 - 2) **Multiple fission:** In multiple fission, the nucleus of parent cell undergoes repeated divisions to produce many daughter nuclei. The cytoplasm also divides and cleaves around each nucleus forming several daughter nuclei in parent cell. In favourable conditions, the parent cell membrane ruptures releasing all daughter nuclei which then behave as independent organisms. E.g. Malarial parasite – plasmodium.
- **Fragmentation:** the multicellular organisms e.g. Spirogyra have simple body organization. i.e. random collection of cells without differentiation of specialized tissues and organs. Such organisms reproduce by breaking off their bodies into small pieces called fragments. These fragments grow into new individuals by a process of fragmentation.
 - **Budding:** it may be defined as the production of new individual from an outgrowth called bud of the parent individual. In Multicellular organisms e.g. Hydra, a bulging on the body appears as a result of repeated Mitotic divisions in cells, resulting in formation of lateral outgrowth called bud. The bud enlarges in size by further divisions of cells and attains shape of parent to which it is attached. Finally it separates from the parent body and behaves as newly developed Hydra.

- **Spore formation:** it is the method of developing new individuals by forming reproductive structures called spores. Some types of moulds reproduce through sporulation. They produce reproductive cells – spores. Spores are very minute asexual reproductive bodies that are stored in special spore bearing organ called sporangium. When spores mature, the sporangium bursts open to release them.
After they are released, each spore germinates and grows into new individual organisms. ‘ Bread Mould ‘, ferns, fungi reproduce by sporulation.
- **Regeneration:** it may be defined as the ability of an organism to regenerate its lost parts of body which has been removed, as by injury or autonomy (self-amputation of body parts).
Regeneration is carried out by specialized cells which proliferate to produce large number of cells. From this mass of cells, differentiation follows for specification of cell types and tissues. These changes take place in an organized sequence called development. E.g. In Planarians
When a planarian is cut, cells move to the wound site and form blastema (a mass of cells capable of growth and regeneration into organs or body parts) that will begin to form new tissues. Over time these cells will divide and more and more of them will differentiate and form of missing body part will take shape.
- **Vegetative propagation :** it is a method of reproduction, in which vegetative plant part (bulb, runner, rhizome etc) produces a new plant. Such type of vegetative growth is called vegetative propagation – producing genetically identical new plants.

It is of two types:

A. Natural methods: these include

- a. **Tuber of potato:** potato tuber is a modified stem. Many notches can be seen on surface of potato called as ”eye of potato”. Each “eye“ can give rise to new potato under suitable conditions.
- b. **Rhizomes of ginger:** rhizomes are modified underground stems for food storage. These contain nodes, inter nodes and scaly leaves. When buried under soil, rhizomes produce new plants.
- c. **Leaf of Bryophyllum:** leaves have notches on margin. If a leaf is put under soil, small plant saplings grow from notches on leaf margins.

B. Artificial methods :these are methods developed by plant growers and Horticulturists for commercial production of crops. These include

- a. **Grafting:** it is a method in which parts of two plants are joint in such a way that they grow as one plant. Grafting is done between two closely related dicotyledonous plants having vascular cambia.

The rooted plant in which grafting is done is called the ‘stock ’. The portion of other plant (bud, branch) that is grafted on the stock is called the scion.

During grafting, long scion with all the buds intact is placed on cut end of the stock and tied in such a way that cambium of two parts come in contact with each other. The joint is covered with a layer of clay to prevent evaporation of water or pathogen entry. All buds of stock must be removed.

- b. **Cutting:** It is a method in which a stem is given an oblique cut and cut stem is kept under appropriate conditions to give rise to a new plant.

In this method about 20-30 cm long pieces of stem are planted in natural position in wet soil. It gives off roots from lower end and shoots buds from aerial nodes.

A cutting develops a new plant similar to parent plant.

- c. **Layering:** it is a process in which the stem, while still attached to mother plant is buried under soil for a while, till it strikes new roots. It is then detached from mother plant. Layering is of two types:

- I. **Mound layering:** in this, basal part of a lower branch is bent down and covered with soil. The branch tip is kept outside the soil e.g. Gooseberry

Mound layering is performed in herbaceous plants (which have no woody stem) and done



at end of growing season after giving flowers or fruits.

- II. Air layering: it is performed in woody plants. A ring of bark is removed from base of aerial branch, giving branch a deep cut. The cut is then wrapped with powdered form of Sphagnum Moss (used as soil conditioner which increases soil capacity to hold water and nutrients by capillary forces) and rooting hormone. The cut is then closed by a black plastic bag to seal it. The wrapped portion is called 'Goottee'. Rooting takes place in a month and then this branch is detached from parent plant and planted in soil to grow e.g. Jasmine, Orange, and Pomegranate.

➤ **Advantages of vegetative propagation:**

- It allows quick and easy propagation.
- Better qualities of plant can be maintained and quality can even be enhanced as in seedless oranges.
- Makes possible propagation of such plants which have lost capacity to produce seeds.

OASIS Hr. Sec. Educational Institute

SUBJECT: SOCIAL SCIENCE

CHALLENGES TO DEMOCRACY

Qno1. What are the challenges faced by non-democratic countries?

Answer: The main challenge faced by non-democratic governments is the foundational challenge of making the transition to democracy. They have to institute a democratic government by bringing down the existing non-democratic regime and keeping the military from controlling the government. It has to establishing a sovereign and functional state.

Qno2. Mention the three main challenges faced by a democracy.

Answer: The three main challenges are the Foundational challenge, the Challenge of expansion and the challenge of Deepening of democracy.

Qno3. What are the challenges faced by democratic governments?

Answer: Democratic governments face the challenge of expansion. The basic principle of a democratic government has to be established across all the regions, different social groups and various institutions. Greater power should be delegated to local governments. Federal principles have to be extended to all the units of the federation. Women and minority groups should be included in decision making. Strengthening of the institutions and practices of democracy should happen so that people can realize their expectations of democracy.

Different societies have different expectations from different democracies. So, each country has to deal in a unique way to face the challenge, people in that particular country face. If this is to be done peoples' participation is necessary and the control and influence of the rich and powerful people have to be toned down.

Qno4. What do we mean by challenge of expansion?

Answer: The challenge of expansion involves applying the basic principle of democratic government across all the regions, different social groups and various institutions. Greater power should be given to local governments. Federal principles have to be extended to all the units of the federation. Women and minority groups should be including in the decision-making process. That is less and less decisions should remain outside the arena of democratic control. Most countries including India and other democracies like the US face this challenge.

Qno5. What do we mean by challenge of deepening of democracy?

Answer: The challenge of deepening of democracy is faced by all the democracies across the globe. It involves strengthening of the institutions and practices of democracy. This should happen in such a way that people can realize their expectations of democracy. People have different expectations from democracy in different societies. Therefore, this challenge takes different meanings and paths in different parts of the world. The challenge is to strengthen the institutions that help people's participation and control.

The challenge is also to bring down the control and influence of the rich and powerful people in making governmental decisions.

Qno6. What are the Guidelines for political reforms in India?

Answer: Four important guidelines have to be kept in mind when political reforms are carried out. When laws are being revised the government has to be carefully to ensure that wrong political practices are not encouraged. Laws alone cannot resolve challenges; democratic reforms are to be carried out mainly by political activists, parties, movements and politically conscious citizens. Any legal change must carefully look at what results it will have on politics. Sometimes the results may be counter-productive. Generally, laws that seek to ban something are not very successful in politics. Laws that give politicians incentives to do good things have more chances of working. Political reforms should empower people to carry out democratic reforms. The Right to Information Act is a good example of a law that empowers the people to find out what is happening in government and act as watchdogs of democracy. Such a law helps to control corruption and supplements the existing laws that banned corruption and imposed strict penalties.

Democratic reforms should be carried out through political practice. They should strengthen democratic practices. Political reforms are of no use if they are not implemented. So, political reforms should be formulated, with implementation as the focal factor.

Qno7. Which law empowers the people to act as watch dogs of the government in a democracy?

Answer: Right to Information Act is the law that empowers the people to act as watch dogs of the government in a democracy.

OUTCOMES OF DEMOCRACY

Qno1. How does democracy produce an accountable, responsive and legitimate government?

Answer: The democratically elected government is answerable to people. If a government does not function as per the wishes of the people, it would lose the next elections and would be thrown out of power. Hence, it needs to be accountable to the people. Similarly, the government has to be responsive to the problems and aspirations of people; otherwise people would choose the next better alternative when the opportunity comes. The government is elected by the majority of the people and hence is a legitimate government.

Qno2. What are the conditions under which democracies accommodate social diversities?

Answer: Conflicts arising out of social diversity are not possible to be completely eliminated. Yet such conflicts are kept at the minimum possible level in a democracy. Democracy builds on consensus in which interests of various sections of the society are respected and catered to. Thus, social diversities are accommodated in a democracy.

Qno3. Give arguments to support or oppose the following assertions:

(a) Industrialized countries can afford democracy but the poor need dictatorship to become rich.

Answer: Although examples of many countries under dictatorship suggest that economic growth can be good in such countries, yet some democracies are also in sound economic health. Many poor countries of the past have progressed under democratic rule, although the growth may have been slow. Looking at the cost benefit analysis, it can be said the even for a poor country, democracy is always a better option rather than dictatorship to strive for becoming rich.

(b) Democracy can't reduce inequality of incomes between different citizens.

Answer: This is a true reality that inequality of incomes cannot be reduced between different citizens; no matter which type of government system is in place. Even the past experience of socialism in Russia and China suggest that it is almost impossible to create a society where everyone is equal in terms of economic power. The same holds true for democracy also.

(c) Government in poor countries should spend less on poverty reduction, health, education and spend more on industries and infrastructure.

Answer: While it is always prudent to spend on industries and infrastructure for better employment generation, the role of social security cannot be ignored. There are many people who are so poor and oppressed that they need some sort of help to improve their condition. Poverty eradication, health benefits and education schemes should always be in place for such people. A proper balance should be struck in spending on social security and on industries.

(d) In democracy all citizens have one vote, which means that there is absence of any domination and conflict.

Answer: In theory, it is true that the formula of one person one vote negates the effect of domination and conflict. But in the real world, a society can be very complex. It is a basic instinct of people or a group of people to dominate others at the very first opportunity. Similarly, conflicts are bound to arise in the society. However, democracy minimizes the effect of such tendency to a certain extent.

Identify the challenges to democracy in the following descriptions. Also suggest policy/institutional mechanism to deepen democracy in the given situations:

(a) Following a High Court directive a temple in Orissa that had separate entry doors for dalits and non-dalits allowed entry for all from the same door.

Answer: This example shows the challenge of ensuring dignity and freedom of its citizens. In this case, the judiciary interfered in the matter and the Right to Equality was enforced.

(b) A large number of farmers are committing suicide in different states of India.

Answer: This is a challenge of economic inequality. The government can implement some bailout package so that farmers are not forced to commit suicide. This can be done through providing a minimum support price for the farm produce and some sort of loan waiver scheme for the farmers.

(c) Following allegation of killing of three civilians in Gandwara in a fake encounter by Jammu and Kashmir police, an enquiry has been ordered.

Answer: This is a challenge of dignity and freedom of citizens and the Right to Equality. The police department and the Judiciary can take corrective measures in this case.

Qno5. In the context of democracies, which of the following ideas is correct – democracies have successfully eliminated:

- Conflicts among people
- Economic inequalities among people
- Differences of opinion about how marginalized sections are to be treated
- The idea of political inequality

Answer: (d) The idea of political inequality

Qno6. In the context of assessing democracy, which among the following is odd one out? Democracies need to ensure:

- Free and fair elections
- Dignity of the individual
- Majority rule
- Equal treatment before law

Answer: (c) Majority rule

Qno7. Studies on political and social inequalities in democracy show that

- Democracy and development go together.
- Inequalities exist in democracies.
- Inequalities do not exist under dictatorship.
- Dictatorship is better than democracy.

Answer: (b) Inequalities exist in democracies

EXTRA QUESTIONS

Q1. Give reasons why a democratic government is preferred to other forms of governments.

Solution: Democracy promotes equality among its citizens. It enhances the dignity of the individual and people are free to make decisions. In a democracy conflicts are solved amicably and there is room to correct mistakes. This is why a democracy is preferred to other forms of governments.

Q2. What are the main features of a democracy?

Solution: Democracies have a formal constitution; they hold elections, have political parties and guarantee rights to its citizens.

Q3. What is the basis of democracy and what are its advantages?

Solution: Democracy is based on the idea of deliberation and negotiation. Deliberation and negotiation have an advantage as they ensure that the decisions taken are acceptable to all the people.

Q4. Mention a few factors that determine the economic growth of a country.

Solution: The factors that determine the economic growth of a country are:

- (i) Population
- (ii) Size
- (iii) Natural resources
- (iv) Relationship with other countries
- (v) Global situation
- (vi) Geographic position
- (vii) Economic policies of the government

Q5. What are the challenges faced by democratic governments?

Solution: Democratic governments face the challenge of expansion. The basic principle of a democratic government has to be established across all the regions, different social groups and various institutions. Greater power should be delegated to local governments. Federal principles have to be extended to all the units of the federation. Women and minority groups should be included in decision making. Strengthening of the institutions and practices of democracy should happen so that people can realize their expectations of democracy.

Different societies have different expectations from different democracies. So, each country has to deal in a unique way to face the challenge, people in that particular country face. If this is to be done peoples' participation is necessary and the control and influence of the rich and powerful people have to be toned down.

Q6. Write a brief note on freedom and dignity to citizens in democratic and non- democratic countries.

Solution: The dignity and freedom of the individual is well preserved in a democracy. It is natural that every individual wants to receive respect from fellow beings. Often conflicts arise among individuals because some feel that they are not treated with due respect.

In non-democratic countries people do not enjoy freedom as they have always been dominated. They have been treated as sub-ordinates.

In democratic and non-democratic countries we find that men dominated the society. Women had to struggle for equal treatment in society. In India we find that female feticide is still prevalent in villages.

In modern democracies the laws have ensured that women are treated equally in society. In a non-democratic set up, this is not possible as the principle of individual freedom and dignity is not a legal or moral force.

In India caste inequalities is another problem that the fibre of democracy faces. Atrocities and discriminations against certain castes still continue in India. The Indian government is taking all steps the set this right. This is possible in a democratic set up, as the laws of the country are against inequality of caste. Many reservation policies are in force in India, to uplift the people of the lower castes. A democracy transforms people from the status of a subject into that of a citizen.

Q7. A democratic government has to be accountable, responsive and legitimate government.

Discuss.

Solution: Democracy is based on the idea of deliberation and negotiation. They ensure that the decisions taken are acceptable to all the people.

Democracies are accountable to its citizens. That is, all decision making has to be transparent. This factor is missing from a non-democratic government. In a democracy, citizens also take part in decision making.

Democracies are responsible for the decisions they make. If a wrong decision is made, it is the duty of the government to rectify it. In a non-democratic government, decisions are taken by a single person and the questions of rectification do not arise, even if it is a wrong decision.

Deliberation and negotiation cause delay. So in a democracy there is a possibility of delay when some major decisions have to be taken. This delay may be costly. The cost of time that democracy pays is perhaps worth it as the decision will be acceptable to all.

Democracies follow a constitution, so they are legitimate. The laws of the country are applicable to everyone, even to the government members. Free and fair elections are held in democracies and the people have the power to eliminate parties they are not happy with, in the next election. In a non-democratic government this is not possible as elections are not held. Democracies have to be responsive. The government should function in a transparent manner and the common man should be able to approach the government to address his grievances.

DISASTER MANAGEMENT ROAD SAFETY EDUCATION

Q1. Write a note on Road Safety Education?

Ans: Road Safety Education is the programme of educational activities about road safety that is provided in formal and community education settings. It seeks to develop the behaviour and attitude for safe road use relevant to the development of children and young people as passengers, pedestrians, cyclists and as novice drivers. The ultimate goal of this education is to prevent road accidents.

Q2. Why Road Safety Education is needed?

Ans: According to a survey from WHO, each year road traffic injuries take away lives of 1.2 million people around the globe. The death toll is on the higher side for the developing countries like India. Every year 5 lakh road accidents are reported in India in which 1.5 lakh people lose their lives. This is mostly due to the lack of safety norms. Hence, in order to address the issue of road safety and minimize accidents, there is a dire need of Road Safety Education.

Q3. Why do children have accidents?

Ans: Children have accidents due to the following common reasons:
Children are often absorbed in their own immediate interests and remain oblivious to their surroundings.

- Lack of experience or development
- Curiosity or spirit of adventure may lead a child into danger of accidents
- Tensions at home may cause a child to run blindly into danger
- Inadequate supervision of parents
- Lack of awareness on understanding of traffic signals and traffic rules

Q4. How accidents are caused?

Ans: Accidents are caused due to one or more of the following reasons:

- Driving at a very fast speed and reckless driving
- Use of mobile phones while driving
- Eating, smoking, or talking with other passenger while driving
- Driving fatigue & falling asleep while driving
- Drink driving and driving while under the influence of Narcotic drugs
- Defective automobile
- Poor weather conditions

Q5. Who can prevent accidents?

Ans: There are different segments of people who can help to prevent accidents:

Traffic Police: They need to persuade safe behaviour among people, by applying law.

People representatives: They need to pass appropriate laws regarding road safety and ensure their implementation.

Civil Society: They need to be involved in initiating and supporting local action to improve road safety.

Teachers: They need to receive in-service training in road Safety Education in order to give planned educational opportunities to their students.

Drivers: They need to be made aware of children's limitations in traffic.

Q6. Write a short note on Motor Vehicle (Amendment) Bill, 2016?

Ans: Government of India has approved the Motor Vehicle (Amendment) Bill, 2016 to improve road safety scenario in the country. The bill seeks to amend Motor Vehicles Act (MCA), 1988 and proposes immense penalties against violations of road safety rules as a prevention measure.

Q7. Describe the key features of Motor Vehicle (Amendment) Bill, 2016?

Ans: Key features of the bill:

- Compensation:
 - Increases compensation for hit and run cases to Rs. 2 Lakh from Rs. 25000
 - Adds provision for payment of compensation in road accident fatalities upto Rs. 10 Lakh

The school bus drivers who are caught driving while drunk shall be charged a fine of Rs. 50,000 along with three years' imprisonment

Rs 3 lakh fine and imprisonment for 7 years for causing death of a child

Violating traffic signal three times will result in Rs. 15,000 fine, license cancellation for a month and compulsory refresher training

E-Governance: It focuses on improving delivery of services to the stakeholders. It enables:

Online learning licenses

Increases period of driving licenses validity

Do away with the requirements of educational qualifications for transport licenses

Offences committed by Juveniles: The owner or guardian will be deemed guilty in cases of offenses by the juveniles. Juvenile will be tried under Juvenile Act and the registration of Motor Vehicle will be cancelled

Q8. Write a short note on Traffic Authority in India?

Ans: Transport Department is the Traffic Authority in India. It has been established for enforcement of the provisions of the Motor Vehicles Act (MVA), 1988. It is one of the largest revenue earning departments dealing with various transport related matters like driving licenses, registration of motor vehicles, grant and renewal of permits and other regulatory and enforcement services. It works with two of the concerned authorities. They are State Transport authority and Regional Transport authority.

Q9. List the services offered by Regional Transport Office (RTO)?

Ans: R.T.O offers following services:

Related to Driving License:

Issues/renews learner license

Issues/renews driving license

Issues international driving permit

Related to Registration of Vehicles:

Temporary registration of vehicles

Permanent registration of vehicles

Transfer of ownership

Issuance of clearance certificate/no objection certificate

Q10. Describe 4Es which need to be followed to prevent accidents?

Ans: In order to prevent road accidents, we need to follow the following four Es:

E: Engineering: It involves altering the environment to prevent accidents by planning improvements such as traffic signals, pedestrian crossings, junction layouts and speed control humps.

E: Execution: It involves proper execution of laws by the Traffic Police to reduce accidents.

E: Encouragement: It involves encouraging people to avoid road accidents by promoting road safety campaigns through newspapers, radio, T.V, books, and magazines.

E: Edification: It involves gaining of appropriate and proper knowledge about road safety to prevent accidents. This is done through Road Safety Education Programmes.

LIFELINES OF NATIONAL ECONOMY

Multiple choice questions

(i) Which two of the following extreme locations are connected by the east-west corridor?

- (a) Mumbai and Nagpur
- (b) Silcher and Purbandar
- (c) Mumbai and Kolkata
- (d) Nagpur and Siligudi

Answer: (b) Silcher and Purbander

(ii) Which mode of transportation reduces trans-shipment losses and delays?

- (a) Railways
- (b) Roadways
- (c) Pipelines
- (d) Waterways

Answer: (c) Pipelines

(iii) Which one of the following states is not connected with the H.V.J. pipeline?

- (a) Madhya Pradesh
- (b) Maharashtra
- (c) Gujarat
- (d) Uttar Pradesh

Answer: (b) Maharashtra

(iv) Which one of the following ports is the deepest land-locked and well protected port along the east coast?

- (a) Chennai
- (b) Paradip
- (c) Tuticorin
- (d) Vishakhapatnam

Answer: (d) Vishakhapatnam

(v) Which one of the following is the most important modes of transportation in India?

- (a) Pipeline
- (b) Railways
- (c) Roadways
- (d) Airways

Answer: (b) Railways

(vi) Which one of the following terms is used to describe trade between two or more countries?

- (a) Internal trade
- (b) International trade
- (c) External trade
- (d) Local trade

Answer: (b) International Trade

Answer the following questions in about 30 words:

- (i) State any three merits of roadways.
- (ii) Where and why is rail transport the most convenient means of transportation?
- (iii) What is the significance of the border roads?
- (iv) What is meant by trade? What is the difference between international and local trade?

Answer:

(i) Three merits of roadways are:

The cost of construction of roads is much lower than that of railway lines.

Roads can go through the dissected and undulating land areas.

Transportation of goods by roadways is economical as loading costs are low and they also provide door-to-door services.



(ii) Rail transport is the most convenient means of transportation in the northern plains because the region has level stretches of land making it easy for laying railway tracks. Along with this, large population and rich agricultural resources make the rail transport a profitable venture.

(iii) Border roads are of strategic importance and they have improved accessibility in the areas of difficult terrain like the northern and north eastern border areas. They have helped in the economic development of these areas.

(iv) The exchange of goods among people, states and countries is termed as trade.

Trade between two or more countries is called international trade.

Trade occurring within a country is termed as local trade. It is carried out within cities, towns and villages of a country.

Answer the following questions in about 120 words:

- i) Why the means of transportation and communication are called the lifelines of a nation and its economy?
- ii) Write a note on the changing nature of international trade in the last fifteen years.

Answer:

- i) The means of transportation and communication are called the lifelines of a nation and its economy because they are the pre-requisites for the development of a country. They help to develop active links between different regions. This facilitates transportation of goods and services from production units to the demand locales. Fast-developing communication channels between different countries of the world have given rise to the Globalization. Today, India is well-linked with the rest of the world which has been possible only due to transport and communication. Railways, airways, waterways, television, radio, newspapers, internet, etc., have contributed vastly to the socio-economic progress of our country. They have also added substantially to growing amenities and facilities improving our lifestyles.
- ii) International trade has undergone a vast change in the last fifteen years:
Exchange of information and knowledge has surpassed the exchange of goods and commodities.
India has emerged as a software giant at the international level and is earning huge amounts of foreign exchange through its advanced software knowledge and excellence in the field of information technology.
Tourism has also played a big role in improving India's position in international trade. Tourism in India has grown substantially over the last three decades.
The commodities imported by India included petroleum and petroleum products (41.87%), pearls and precious stones (29.26%), inorganic chemicals (29.39%), coal, coke and briquettes (94.17%) machinery (12.56%).
Bulk imports as a group registered a growth accounting for 39.09% of total imports. This group includes fertilizers (67.01%), cereals (25.53%), edible oils (7.94%) and newsprint (5.51%).



MANUFACTURING INDUSTRIES

Multiple choice questions

(i) Which one of the following industries uses limestone as a raw material?

- (a) Aluminium (b) Cement (c) Sugar (d) Jute

Ans: (b) Cement

(ii) Which one of the following agencies markets steel for the public sector plants?

- (a) HAIL (b) SAIL (c) TATA Steel (d) MNCC

Ans: (b) SAIL

(iii) Which one of the following industries uses bauxite as a raw material?

- (a) Aluminum (b) Cement (c) Jute (d) Steel

Ans: (a) Aluminum

(iv) Which one of the following industries manufactures telephones, computer, etc.?

- (a) Steel (b) Electronic (c) Aluminum (d) Information Technology

Ans: (b) Electronic

Answer the following briefly in not more than 30 words.

(i) What is manufacturing?

(ii) Name any three physical factors for the location of the industry.

(iii) Name any three human factors for the location of an industry.

(iv) What are basic industries? Give an example.

(v) Name the important raw materials used in the manufacturing of cement?

Answer:

(i) Manufacturing is the process in which goods are produced after processing the various raw materials.

(ii) Three physical factors for the location of the industry are:

→ Availability of raw material

→ Suitable climate

→ Availability of water and power supply

Three human factors for the location of an industry are

→ Availability of cheap labor

→ Availability of services such as consultants and financial advice

→ Availability of Market

(iii) Basic industries are those which supply their raw materials to industries which manufacture other goods. An example is the iron and steel industry which supplies steel to the automobile industry.

(iv) The important raw materials used in the manufacturing of cement are: limestone, silica, alumina and gypsum.

3. Write the answers of the following questions in 120 words.

(i) How are integrated steel plants different from mini steel plants? What problems does the industry face? What recent developments have led to a rise in the production capacity?

(ii) How do industries pollute the environment?

(iii) Discuss the steps to be taken to minimize environmental degradation by industry?

Answer:

(i) Integrated Steel Plants are large plants which handle everything in one complex – from putting together raw material to steel making, rolling and shaping.

Mini Steel Plants are smaller, have electric arc furnaces, use mainly steel scrap and sponge iron as inputs. They have rerollers that use steel ingots as well. They produce mild and alloy steel of given specifications.

Problems of Steel Industry:

- High costs and limited availability of coking coal
- Lower productivity of labour
- Irregular supply of power → Poor infrastructure

Following are some recent developments that have led to a rise in the production capacity:

- Liberalization
- Foreign direct investments (FDI) with the efforts of private entrepreneurs
- Improvement in production process by the use of newer technologies

(ii) Industries are responsible for four types of pollution – air, water, land, and noise pollution.

Following are the various reasons:

- Air pollution is caused by the presence of high proportion of undesirable gases, such as sulphur dioxide and carbon monoxide.
- Water pollution is caused by organic and inorganic industrial wastes and effluents discharged into rivers.
- Thermal pollution of water occurs when hot water from factories and thermal plants are drained into rivers and ponds before cooling.
- Wastes from nuclear plants cause cancer, birth defects and miscarriages.
- Dumping of wastes especially, glass, harmful chemicals, industrial effluents, packaging, salts and other garbage render the soil useless.
- Noise pollution is caused due to industrial and construction activities, factory equipment, generators, electric saws, drills and other machineries.

(iii) The steps to be taken to minimize environmental degradation by industry are:

- To control water pollution, industrial effluents need to be treated on all three levels (primary, secondary and tertiary); the use of water for processing should be minimized via reuse and recycling; rainwater can be harvested to meet water requirements, and ground water usage should be regulated by law.
- For the minimization of air pollution, smoke stacks should be fitted to factories with electrostatic precipitators, fabric filters, scrubbers and inertial separators. Also, smoke can be reduced by using oil or gas instead of coal.
- Noise pollution can be controlled by fitting generators with silencers, redesigning machinery to reduce noise, and using earplugs and earphones besides other noise absorbing material.



TOPIC: PRINT CULTURE AND THE MODERN WORLD

Questions with Answers

Q1: Give reasons for the following:

- a) **Woodblock print only came to Europe after 1295.**
- b) **Martin Luther was in favour of print and spoke out in praise of it.**
- c) **The Roman Catholic Church began keeping an index of prohibited books from the mid-sixteenth century.**
- d) **Gandhi said the fight for Swaraj is a fight for liberty of speech, liberty of the press and freedom of association.**

Answers:

- a) China had a technology of woodblock printing. In 1295, Marco Polo, a great explorer, returned to Italy after many years of exploration in China. He brought the technology of woodblock printing back with him. So Italians began producing books with woodblocks and soon the technology spread to other parts of Europe as well.
- b) Martin Luther criticized the practices and the rituals of the Roman Catholic Church through the publication of his protestant ideas. He wrote ninety five Theses which challenged the church ideas. His writings were reproduced in large numbers and read widely. This led to the division of the Church and to the beginning of the Protestant Reformation. His translation of the New Testament also gained wide popularity. He was thus deeply grateful to the print and hence called printing the ultimate as well as the greatest gift of God.
- c) Print and popular religious literature stimulated many distinctive individual interpretations of faith among the working people. So people began to interpret Bible in their own ways and also formulated different views of God and Creation. Thus, Roman Catholic Church troubled and enraged by such effects of popular readings and questioning of faith, imposed severe controls over publishers and booksellers and began to maintain an Index of Prohibited Books from 1558.
- d) The colonial government kept track of all the books and newspapers published in India and passed many laws to control the press. This was because the colonial government was well aware of the power of print and knew it was the binding force that connected communities and people in different parts of India. Hence, Gandhi said that the fight for Swaraj is the fight for liberty of speech, liberty of the press, and freedom of association.

Q2: Write short notes to show what you know about:

- a) **The Guttenberg's Press**
- b) **Erasmus's idea of the printed book**
- c) **The Vernacular Press Act**

Answers:

- a) Gutenberg had, from his early childhood, seen olive and wine presses. He used this technology to develop his innovation of printing press. By 1448, Gutenberg had perfected the system of printing press. The first book he printed was the bible. About 180 copies were printed and it took three years to produce them. By the standards of the time this was fast production.
- b) Erasmus was a Latin scholar and a Catholic reformer. He criticized the printing of books. He thought that most of the books are stupid, ignorant, scandalous, raving, irreligious, and seditious. According to him such books devalue even the most valuable books.
- c) The vernacular press act was passed in 1878. It was modeled on the Irish Press Laws. It provided the government with extensive rights to censor reports and editorials in the vernacular press. Hence, through this Act government kept regular track of the vernacular newspapers. If a report was considered seditious, the newspaper was warned. If the warning was ignored the press was liable to be seized and the printing machinery was confiscated.

Q3: What did the spread of print culture in the nineteenth century India mean to?

- a) Women
- b) The poor
- c) Reformers

Answers:

- a) The spread of print culture in the 19th century largely benefited the women folk of India. It increased their opportunities to access learning and education. In liberal families women education was supported by the males and were hence sent to schools to pursue education. Printed books and journals had made many realize the importance of women's education. On the contrary the Hindu and Muslim conservative families still didn't allow such education for women and hence prohibited women from pursuing education as they thought it would make them corrupt. This sometimes led to rebellion as many oppressed women began to read and write books secretly. Some of these even wrote their own books and autobiographies. So print culture to a large extent helped in making Indian women self-reliant.
- b) The print culture made the books available to the public at cheaper rates. Besides this, setting of public libraries in most of the cities towns and even villages expanded the access to books. The local people like the factory workers were encouraged by the writings of social reformers leading to many protests. Many factory owners set up their own libraries and some even wrote their own books.
- c) Print culture's popularity was an advantage for social and religious reformers as they spread their opinions, through newspapers and books, across the masses. These ideas were debated upon by different groups of people. Reformist ideas were put forward in the local, everyday languages of the common people so as to create a wider platform for the same.

Discuss:

1. Why did some people in the eighteenth century Europe think that print culture would bring enlightenment and end despotism?

Answer: In the 18th-century books were considered to be a means of spreading progress and enlightenment. Books were thought to have a potential of changing the world and liberate the society from the despotism. Many scholars declared that printing press was the most powerful engine of the progress. It was stated that the power of press was such that it could bring enlightenment and destroy the basis of despotism. Print culture popularized the ideas of enlightenment thinkers who demanded that everything should be judged through the application of reason and rationality. Print culture created a new culture of dialogue and debate and also produced a literature that raised questions on the existing social order.

2. Why did some people fear the effect of easily available printed books? Choose one example from Europe and one from India.

Answer: Print culture brought with itself a lot of apprehensions and many people were worried about its popularity. This anxiety was shared by many people like the religious authorities and monarchs as well as many writers and artists. It was feared that if there was no control over what was printed it could generate rebellious and irreligious thoughts which could in turn destroy the authority of the valuable literature. Some feared that the spread of literacy among the common masses would threaten their position. This anxiety can be understood by the following examples:

- a) In Europe the Roman Catholic Church tried to curb the printed books through maintaining an Index of prohibited books from 1558.
- b) In India the Vernacular Press Act imposed restrictions on Indian press and local newspapers

3. What were the effects of the spread of print culture for poor people in the nineteenth century India?

Answer: The effects of the spread of print culture for poor people in nineteenth century India were:

- The poor people were benefited from the spread of print culture as they got access to the low-price books.



- Many social reformers wrote books and essays enlightening the caste discrimination prevailing in the country. These were read by people across the country.
- In 1871, Jyotiba Phule wrote about the poor condition of the low caste people. In the 20th century, B.R. Ambedkar also wrote powerfully against the caste system.
- EV Ramaswamy Naicker, also known as Periyar, wrote about the caste system prevailing in Madras.
- The poor became more aware of their rights and their place in society.

4. Explain how print culture assisted the growth of nationalism in India.

Answer. The print culture assisted the growth of nationalism in India in the following ways:

- Books, magazines and newspapers helped in the spread of new ideas. They also shaped the nature of debate that assisted the growth of nationalism.
- Gandhiji spread his ideas of Swadeshi in a powerful way through newspapers.
- Many vernacular newspapers reported oppressive methods of colonial rule and helped to spread the nationalism in India.
- National leaders tried to mobilize public opinion of Indian masses through the national dailies to unite them for the cause of nationalism.
- Printers like Raja Ravi Verma and Rabindranath Tagore produced images of Bharatmata which produced a sense of nationalism among Indians. The ever increasing devotion to mother figure could be seen as an evidence of people's nationalism.
- Print culture not only encouraged nationalist activities, but it also connected communities and people living in different parts of India.

OASIS Hr. Sec. Educational Institute

Protecting Ourselves from Disaster

Disaster Management

Q1. Write in details the role of Search and Rescue team during a disaster?

Ans. The role of Search and Rescue team during a disaster is:

- i. To search the victims and timely rescue them to safety.
- ii. To provide first aid to victims and transport them to hospitals.

Q2. What should be the approach to help a fire burnt patient?

Ans. Adopt the following approach to help a fire burnt patient:

- i. Immediately pour water on the burnt area.
- ii. Cover the burnt area with clean cloth.
- iii. Keep on giving plenty of fluids to drink till the victim reaches hospital.

Q3. Explain in detail the first, second and third degree of burns?

- i. First Degree Burn: These are superficial burns involving top layer of the skin. Skin appears red and very painful.
- ii. Second Degree Burn: These are partial thickness burns involving two layers of the skin namely epidermis and dermis. The skin is red having blisters and is very painful.
- iii. Third Degree Burn: These are full thickness burns and involve all the layers of the skin along with muscles, vessels and nerves. The burn areas are less painful.

Q4. What is safe construction practice?

Ans. Safe construction practice means to construct and design disaster resistant buildings. It helps to reduce the extent of damage and loss during disasters like earthquakes, floods etc.

Q5. What should be the role of community during a disaster?

Ans. Role of community during a disaster:

- i. To prepare the people before disasters.
- ii. To manage the grave situation during as well as after the disasters.

SHORT ANSWERS

Q1. What equipments should be carried by a rescuer?

- a. Equipments for personal safety of Rescuer: Helmet, Life jacket, Gumboots, Torch and Whistle.
- b. Equipments for safety of victims: First aid kit, Ladders, Ropes, Pulleys, small cutting tools, Hammer etc.
- c. Ultra Modern Search Equipment: Infrared cameras, Bio radars, Life locators and Acoustic devices.

Q2. What is ABC formula in disaster management?

Ans.

- A = Airways,
B = Breathing,
C = Circulation

Q3. What should be the constituents of First Aid Kit?

Ans. First Aid Kit consists of light weight box which contains some medicines, bandages, gloves, sterile cotton & dressings, soap, antiseptic solution, small towels, scissors, AMBU bag, Oral Rehydration Solution (ORS)

FILL IN THE BLANKS

- i. 100 and 101 numbers should be dialled in case of emergency.
- ii. Sudden temporary loss of conscience because the temperature regulation system of the body fails is known as Heat Stroke.
- iii. A kit containing some medicines, bandages, dressings etc for immediate treatment is called as First Aid Kit.
- iv. NDMA stands for National Disaster Management Authority.
- v. Strengthening of old buildings is called as Retrofitting.



- vi. *Plastic bags are non-biodegradable.*
- vii. *Kashmir falls in seismic zones IV and V*
- viii. *Burn is defined as a damage to skin caused by direct contact with dry heat, fire flames, steam, hot liquids, hot metals, sunlight, electricity or chemical, radiological and nuclear material*
- ix. *Dog bites could cause a deadly disease called Rabies.*
- x. *DRABC stands for Danger, Response, Airway, Breathing, and Circulation.*

ADDITIONAL QUESTIONS:

1. What is Mechanical defibrillation?

Ans) In an electric shock, the heart rate becomes irregular. In this case, the first aid volunteer should give thumping blow by fist of hand on centre of chest of the victim. This is known as Mechanical Defibrillation. It can be a life saving measure.

2. What are Seismic Bands?

Ans) Seismic bands are constructed using either reinforced concrete or timber. These bands act like a ring or belt and provide strength to the building. Seismic bands can be provided at the plinth level, lintel level and eave level of the building.

3. What measures should be taken while construction of buildings in earthquake prone areas?

Ans) Safe construction measures:

- i. The building should have a simple rectangular plan.
- ii. Long walls should be supported by reinforced concrete.
- iii. Seismic bands should be laid at plinth level, lintel level and eave level
- iv. Doors and windows should be small and more centrally located in the walls.

4. State the ill effects of plastic bags/polythene?

Ans) Ill effects of plastic bags/polythene:

- i. Plastic bags litter the landscape. This reduces rain water percolation.
- ii. Plastic bags kill nearly about 100000 animals every year..
- iii. Plastic bags are non-biodegradable and hence, contaminate soil.
- iv. Chemicals of plastic bags may cause cancer and other health problems.

5. What should be done to avoid polythene?

- i. Use of shopper bags for carrying shopping goods.
- ii. Use of wooden made shopping baskets.
- iii. Use of jute bags for carrying goods.
- iv. Use of self made paper bags or cloth bags.

پونٹ سوم

مقالہ

مقالہ عربی زبان کا لفظ ہے جس کے معنی ہیں قول۔ یعنی کوئی بات دلیل اور بحث کے ساتھ بیان کرنا۔ اصطلاح میں اُس تحریر کو کہتے ہیں جس میں کسی موضوع یا شخصیت کے بارے میں پوری تحقیق کے ساتھ بحث کی جائے تاکہ وہ موضوع پوری طرح سے مکمل اور مدلل بیان ہو۔ مقالہ ایک تحقیقی کوشش کا نتیجہ ہوتا ہے یعنی مقالہ نگار اپنے مضمون کو پوری چھان بین اور تحقیق کے ساتھ پیش کرتا ہے۔ اس میں دلائل سے گفتگو کی جاتی ہے۔ مقالہ کی زبان صاف ستھری، مدلل اور سنجیدہ ہونے کے ساتھ ساتھ عالمانہ ہوتی ہے اس لئے یہ صنف ادبی لحاظ سے بڑی کارآمد ہوتی ہے۔ مقالے انسانوں کی زندگی، اخلاقی، سیاسی، تمدنی اور تاریخی غرض ہر موضوع پر لکھے جاتے ہیں اور موضوع کے مختلف پہلوؤں کو اجاگر کر کے اُن پر تفصیلی بحث کی جاتی ہے۔

مقالہ لکھنے کے لیے سب سے پہلے عنوان کا انتخاب بڑی اہمیت رکھتا ہے۔ اس کے بعد موضوع کے بارے میں ضروری معلومات اکٹھا کرنا، اُن کی ترتیب اور تجرباتی تسلسل کے ساتھ خاکہ تیار کرنا اچھے مقالے کے لیے لازمی چیزیں ہیں۔ اس میں تخیل پر زور دینے کے بجائے حقائق کی پردہ داری کی جاتی ہے۔ اس میں فلسفے اور حکمت کا عمل دخل ہوتا ہے اور تجربہ اور تاثرات کا دیانت داری سے مطالعہ ہوتا ہے۔ اردو میں بھی بڑے بڑے مقالہ نگار پیدا ہوئے ہیں اور آج کل بھی مقالے علمی اور ادبی اعتبار سے بڑی اہمیت رکھتے ہیں۔

----- خواجہ غلام السیدین ----- (۱۹۰۴ - ۱۹۷۱)

خواجہ غلام السیدین پانی پت میں ۱۱۶ اکتوبر ۱۹۰۴ء کو پیدا ہوئے۔ آپ کے والد کا نام خواجہ غلام الثقلین تھا جو خواجہ الطاف حسین حالی کے نواسے تھے۔ آپ بچپن سے ہی بڑے ذہین تھے۔ دسویں جماعت سے لیکر بی۔ اے تک ہر امتحان میں اول آئے۔ سرکار کی طرف سے آئی سی ایس کرنے کے لئے انگلستان بھیجے گئے لیکن آپ کو انتظامی امور سے زیادہ درس و تدریس کا کام زیادہ پسند تھا۔ اس لئے آپ نے وہاں ایم۔ ایڈ کی ڈگری امتیاز کے ساتھ حاصل کی اور واپس آ کر علی گڑھ میں انگلش اسکول کے سربراہ مقرر ہوئے۔ پھر آپ ٹیچرس ٹریننگ کالج کے پرنسپل کی حیثیت سے بلائے گئے وہاں سے ریاست رام پور میں مشیر تعلیم کی حیثیت سے بلائے گئے۔ اس کے بعد آپ کشمیر میں ناظم تعلیم مقرر ہوئے۔ حکومت ہند کی وزارت تعلیم کے مشیر اور جوائنٹ سیکرٹری کے عہدوں پر بھی آپ نے کام کیا ہے اور اس کے علاوہ آپ نے امریکہ کی مختلف یونیورسٹیوں میں مشیر اور پروفیسر کی حیثیت سے خدمات انجام دی ہیں۔ آپ نے چند دن کی علالت کے بعد ۱۹ دسمبر ۱۹۷۱ء کو علی گڑھ میں ہی وفات پائی۔

خواجہ غلام السیدین ایک نامور اور تجربہ کار ماہر تعلیم تھے۔ انہیں تحریر و تقریر دونوں پر یکساں قدرت حاصل تھی۔ انہوں نے زیادہ تر انگریزی زبان میں لکھا۔ آپ کی تحریر دل کش، سادہ اور پُر اثر ہونے کے ساتھ ساتھ شیریں ہے۔ آپ کی طبیعت میں بھی شیرینی اور مزاج میں خلوص تھا۔ آپ ایک سچے اور قول و فعل کے اعتبار سے پکے معلم تھے۔ آپ نے ساری عمر پڑھنے اور پڑھانے میں گزاری۔ نوجوانوں کی تربیت کا شوق اور جذبہ ان میں بے انتہا تھا جس کا ثبوت ان کی تحریروں میں ملتا ہے۔ اردو میں روح تہذیب، آندھی میں چراغ، اصول تعلیم اور قومی سیرت کی تشکیل وغیرہ آپ کی قابل قدر تصانیف ہیں۔

۳۔۔۔۔۔ سوالات کے جوابات ۔۔۔۔۔

سوال ۱) صالح زندگی کی تعمیر کے لیے اقبال نے کس بات کو ضروری قرار دیا ہے؟

جواب: صالح زندگی کی تعمیر کے لئے اقبال نے دو باتوں کو ضروری قرار دیا ہے ایک اپنی خودی کا احترام اور دوسری بات دوسروں کی خودی کا احترام کرنا۔

سوال ۲) خودی سے کیا مراد ہے؟

جواب: خودی سے مراد ہے اپنے آپ کو اور اپنے مقام کو پہچاننا اور سمجھنا۔ یعنی اپنی ذات سے آشنا ہو کر اس کا احترام کر کے اسے انسانیت کی معراج تک لے آنا۔

سوال ۳) دُنیا آجکل کس خطرے کی زد میں ہے؟

جواب:۔ آج کل دنیا تنگ نظری، تعصب، ذاتی عناد اور نسلی حسد کی زد میں ہے۔

سوال ۴) اقبال کی شاعری کے بنیادی فکری پہلو کیا ہیں؟

جواب: اقبال کی شاعری کے بنیادی فکری پہلوؤں میں بنی نوع انسان کی وحدت، رواداری، احترامِ خودی اور انسانیت سازی و انسان دوستی ہے۔ آپ کا کلام اُن مصنوعی اختلافات کو دور کرنے کا پیغام دیتا ہے جن کی وجہ سے ایک انسان دوسرے انسان کا دشمن بنا ہوا ہے جیسے قوم، نسل، رنگ، ذات پات اور تعصب وغیرہ۔

سوال ۵) انسان اور انسانیت کی فلاح کے لیے اقبال کا پیغام کیا ہے؟

جواب:۔ انسانیت کی فلاح و بہبود کے لئے اقبال کا پیغام یہ ہے کہ انسان کی نظر پاک اور اس کا دل وسیع ہو۔ تنگ نظری، تعصب اور نسلی حسد کو دلوں سے نکال کر انسانیت کی خوشحالی اور اطمینان کے لئے راستے ہموار کئے جائیں تاکہ انسان انسان کو اُس کے اصلی روپ میں دیکھ سکے۔

جملوں میں استعمال کیجیے۔

خیال = شاعری زیادہ تر خیال ہی پر منحصر ہوتی ہے۔

تلاش کرنا = ظالموں کی صف میں انصاف کرنے والوں کو تلاش کرنا بے سود ہے۔

ٹھیس = ہمیں دوسروں کے جذبات کو ٹھیس نہیں پہنچانی چاہئے۔

حامی = مولانا حالی جدید تعلیم کے حامی تھے۔

۴۔۔۔۔۔ اقتباس کا خلاصہ ۔۔۔۔۔

یہ اقتباس خواجہ غلام السیدین کے مقالے ”اقبال اور انسانیت“ سے لیا گیا ہے جو ان کی کتاب ”آندھی میں چراغ“ سے ماخوذ ہے۔ اس اقتباس میں خواجہ غلام السیدین علامہ اقبال کے پیامِ انسانیت کی وضاحت کرتے ہوئے کہتے ہیں کہ انسان کو اپنا دل وسیع اور اپنی نگاہ پاک رکھنی چاہئے۔ اُسے تعصب، تنگ دلی اور تنگ نظری اور نسلی حسد سے اپنے آپ کو بچانا چاہئے اور ان چیزوں سے خلاصی پانے کا ایک ہی طریقہ ہے اور وہ ہے اپنے دل و دماغ کو کشادہ کرنا۔ جب یہ امراض دلوں سے رخصت ہونگے تب ہی ایک انسان دوسرے انسان کو انسان ہی کی صورت میں دیکھ سکتا ہے اس طرح انسان دوستی، ہمدردی اور بھائی چارگی کو فروغ ملے گا جس کے سبب انسان دوسرے انسانوں کا دکھ درد بانٹنے والا اور غم ہلکا کرنے والا بن سکتا ہے۔ وہ پھر سائنسی ایجادات اور اپنے تحقیق اور جدوجہد کے مادے کو انسانیت کی فلاح و بہبود کے لئے استعمال کرے گا اور سکون اور اطمینان کی زندگی بسر کرے گا۔

۵۔۔۔۔۔ صحیح جوابات ۔۔۔۔۔

جواب:- خواجہ غلام السیدین

۱:- ”آندھی میں چراغ“ کے مصنف کا نام

جواب:- ستاروں کا جھرمٹ

۲:- ”کہکشاں“ سے مراد ہے۔

جواب:- جدید تعلیم کے حامی تھے

۳:- ”مولانا حالی“

جواب:- ایک یا ایک سے زیادہ کردار

۴:- ”افسانہ“ ایسی نثری کہانی ہے جس میں

ہو سکتے ہیں

جواب:- داستان

۵:- ”باغ و بہار“ ایک

جواب:- انشائیہ ہے

۶:- ”خوشامد“ ایک

۷- ---- گرائمر ----

اسم تصغیر بنانے کے لئے کبھی کسی لفظ کے آخر میں ی، چہ اور جی لگا دیتے ہیں۔ جیسے: پہاڑ = پہاڑی
، صندوق = صندوقچہ ، کتاب = کتابچہ ، دیگ = دیگچہ ، چچ = چچچہ

۸- ---- جملہ ----

دو یا دو سے زیادہ الفاظ کا مجموعہ جس سے بات پوری طرح سمجھ میں آجائے جملہ کہلاتا ہے۔
جملے کی قسمیں:

جملے کی دو قسمیں ہیں: جملہ خبریہ اور جملہ انشائیہ

جملہ خبریہ: وہ جملہ جس سے کسی بات کی خبر دی جائے جیسے اشرف ذہین لڑکا ہے۔

جملہ انشائیہ: وہ جملہ جس سے کوئی حکم یا استفہام، تعجب یا انبساط وغیرہ ظاہر ہو جیسے: اسلم کہاں ہے؟
دروازہ بند کرو، کاش تم یہاں ہوتے وغیرہ۔

جملہ خبریہ کی قسمیں:

جملہ خبریہ کی دو قسمیں ہیں: جملہ اسمیہ، جملہ فعلیہ

جملہ اسمیہ جملہ اسمیہ: وہ جملہ جو دو اسموں سے مل کر بنے۔ اس کے مسندالیہ کو مبتداء اور مسند کو خبر کہتے ہیں

جیسے احمد غیرت مند ہے۔ احمد = مبتداء، غیرت مند = خبر

جملہ فعلیہ: وہ جملہ جو فعل اور فاعل سے مل کر بنے جیسے: احمد بیٹھا، رشید نے گھوڑا بھگا یا۔ اس کے مسند الیہ کو فاعل کہتے ہیں اور اس کا مسند فعل ہوتا ہے۔

جملہ اسمیہ کے اجزا: فعل ناقص، مبتداء، خبر، متعلق خبر
جملہ فعلیہ کے اجزا: فعل تام، فاعل، مفعول، متعلق فعل

<u>جملہ اسمیہ</u>	<u>جملہ فعلیہ</u>
حمید نادان ہے	مقصود دوڑتا ہے
خورشید چالاک ہے	اشرف کھیلتا ہے
کوا کالا ہے	رمیش نے پانی پیا

----- ڈراما -----

ڈراما انگریزی زبان کا لفظ ہے جو کہ یونانی لفظ "Draein" سے مشتق ہے اور جس کے معنی کر کے دکھانے کے ہیں۔ اصطلاح ادب میں ڈراما فرضی کہانی ہے جو باقاعدگی کے ساتھ اسٹیج یا اسکرین پر اداکاروں کے ذریعے مکالموں کی صورت میں ناظرین کے سامنے پیش کی جاتی ہے۔ ڈراما کی ابتداء نقالی سے ہوئی ہے بقول ارسطو "ڈراما انسانی اعمال کی نقل ہے"۔ عملی صورت کی پیشکش ہی ڈراما کو ناول اور افسانے سے الگ کرتی ہے، ڈراما کھیل بھی ہے اور صنف ادب بھی۔ یہ اداکاروں کے ذریعے آپس میں کھیلا جاتا ہے اور اس کے تماشا بین بھی ہوتے ہیں۔ اس میں نثر و نظم کی کوئی قید نہیں ہوتی۔ ڈراما کا تعلق آرٹ سے بھی ہے اور ایک معاملے میں یہ ادب سے الگ بھی ہے کیونکہ ادب لفظوں کے بغیر وجود میں نہیں آسکتا لیکن ڈراما ایسا بھی ہو سکتا ہے کہ اس میں ایک بھی لفظ استعمال نہ کیا گیا ہو۔ فنی اعتبار سے

ڈرامے کو تین حصوں میں تقسیم کیا جاتا ہے، جنہیں پلاٹ، کردار نگاری اور زبان و بیان کہتے ہیں۔
 ڈراما کی اصلاً دو قسمیں ہیں، المیہ اور طربیہ۔ المیہ میں مصیبت اور غم کا عنصر ہوتا ہے اور ناظرین
 مصیبت زدہ کردار کے ساتھ ہمدردی جتا کر عبرت بھی حاصل کرتے ہیں جبکہ طربیہ میں آغاز سے انجام
 تک صرف تفریح و مسرت کا عنصر موجود ہوتا ہے۔

اردو میں ڈراما کی روایت انیسویں صدی عیسوی کے وسط میں واجد علی شاہ کے ”رادھا کنہیا“ سے
 شروع ہوئی۔ کچھ مدت بعد ہی امانت لکھنوی نے ”اندر سبھا“ لکھ کر اردو ڈرامے کی ترقی کے راستے کھول
 دئے۔ بیسویں صدی میں سائنسی ترقی کی وجہ سے اردو ڈرامے کو مزید فروغ ملا۔ آغا حشر کاشمیری نے
 سنجیدگی سے ڈرامے کی ادبی حیثیت پر توجہ دی اور اسی طرح طالب بنارسی، بیتاب بریلوی اور مہدی حسن
 نے ڈراموں کے ترجموں کا سلسلہ شروع کیا۔ دور جدید کے ابتدائی ڈراموں میں امتیاز علی تاج کے
 ”انارکلی“ کو سب سے زیادہ مقبولیت حاصل ہوئی۔ قابلِ قدر ڈراما نویسوں میں سید عابد حسین، پروفیسر
 محمد مجیب، راجندر سنگھ بیدی اور اوپندر سنگھ اشک کے نام لئے جاسکتے ہیں۔

----- محمد عمر نور الہی -----

جموں و کشمیر میں اردو زبان کی خدمت کرنے والوں میں محمد عمر اور نور الہی کا نام کافی بلند ہے، آپ
 وادی کے ایسے دو ادیب ہیں جنہوں نے ہمیشہ اپنے ادبی کام کو اپنے مشترکہ قلمی نام سے ہی شائع کیا۔ محمد
 عمر ۱۸۸۲ء میں جموں کے ایک ایسے خاندان میں پیدا ہوئے جس نے علم و ادب کے میدان میں اہم
 رول ادا کیا ہے۔ آپ کے والدین بچپن میں ہی وفات پا گئے اور آپ کی پرورش آپ کے نانا نے کی۔
 نانا کے انتقال کے بعد آپ کی پرورش آپ کی بے اولاد خالہ نے اپنے ذمے لی۔ آپ نے ۱۹۰۵ء میں
 دسویں کا امتحان پاس کیا اور اعلیٰ تعلیم کے لئے لاہور چلے گئے جہاں آپ نے کرپن کالج میں داخلہ لیا۔

اسی کالج میں آپ کی ملاقات منشی نور الہی سے ہوئی۔ لاہور سے واپسی پر ۱۹۰۸ء میں آپ جموں و کشمیر عدالت عالیہ میں ترجمہ نگار کے عہدے پر فائز ہوئے۔ دورانِ ملازمت ہی وکالت کا امتحان پاس کیا اور ۱۹۳۶ء میں ہی سب حج کی حیثیت سے سبکدوش ہوئے یہاں تک کہ ۱۳ اکتوبر ۱۹۴۶ء کو وفات پا گئے۔ منشی نور الہی ۱۸۸۳ء میں لاہور میں پیدا ہوئے۔ ابتدائی تعلیم کے بعد گورنمنٹ کالج لاہور سے بی۔ اے کیا۔ آپ کرکٹ کے اچھے کھلاڑی تھے اس لئے مہاراجہ پرتاب سنگھ نے جموں بلا کر اپنی ٹیم میں شامل کیا۔ آپ نے تعلیم چھوڑ کر مہاراجہ کے دربار میں ملازمت کی اور ترقی کرتے کرتے تحصیلدار اور پھر ڈپٹی کمشنر کے عہدے تک پہنچے۔ قدرتِ الہی نے ایک بار پھر آپ کو لاہور پہنچایا جہاں ۱۷ اپریل ۱۹۳۵ء کو کچھ عرصہ علیل رہنے کے بعد وفات پائی۔

محمد عمر نور الہی سب سے پہلے لاہور میں طالبِ علمی کے زمانے میں ایک دوسرے سے ملے اور دوستی ہونے کے بعد قربت اتنی بڑھی کہ دوستی رشتہ داری میں بدل گئی۔ دورانِ ملازمت ایسے مواقع بہت کم آئے کہ دونوں ایک ہی جگہ پر تعینات رہے لیکن کسی نہ کسی طریقے سے رابطے میں رہتے تھے اور آپس میں مشورہ کرتے رہتے تھے۔ انہوں نے معتد ڈرامے، افسانے اور تنقیدی مضامین کے ساتھ ساتھ نظم پارے بھی لکھے اور ان کو اپنے مشترکہ قلمی نام سے ہی شائع کرتے رہے۔ منشی نور الہی کے انتقال کے بعد بھی محمد عمر نے اپنی تمام تصنیفات اسی قلمی نام سے شائع کیں۔ ان کا سب سے اہم کارنامہ ”ناٹک ساگر“ کی تالیف ہے جسے ڈرامے کی عالمی تاریخ اور تنقید قرار دیا جاسکتا ہے۔

۳۔۔۔۔۔ سوالات کے جوابات ۔۔۔۔۔

سوال ۱) جنگل میں کاٹتے ہوئے لکڑہارے نے کس کی آواز سنی اور اُس نے اُس سے کیا کہا؟

۱۔ جنگل میں پیڑ کاٹتے ہوئے لکڑہارے نے جب ایک برگد کے پیڑ کو کاٹنا چاہا تو اس پیڑ میں سے آواز آئی۔ یہ پیڑ کہہ رہا تھا کہ مجھے مت کاٹو، بدلے میں تم کو انعام دوں گا۔

سوال ۲) گھر آنے پر لکڑہارے اور اس کی بیوی میں کیوں تو تو میں میں ہونے لگی؟

۲۔ معمول کے مطابق جب لکڑہارے لکڑیوں کا گٹھالے کر آیا تو بیوی کی بد مزاجی کی وجہ سے اُس نے لکڑیوں کا گٹھانا مناسب جگہ پر رکھا اور یہیں سے جھگڑے کی شروعات ہوئی۔ دراصل جھگڑنا اُن کا روز کا معمول تھا اس لئے طعنہ بازی کے بعد لکڑہارا جنگل کی داستان سُناتا ہے تو پھر اُس کی بیوی انعام کی لالچ اور اپنے شوہر کی بیوقوفی پر جھگڑے کو طول دیتی ہے۔

سوال ۳) بوڑھے نے لکڑہارے کے گھر آ کر اُس سے کیا کہا؟

۳۔ بوڑھے نے لکڑہارے سے کہا کہ تم نے جنگل میں برگد کے پیڑ کو نہیں کاٹا اس لئے ہریاول کے بادشاہ نے تمہیں انعام بھیجا ہے۔ تمہاری تین منہ مانگی مرادیں پوری کی جائیں گی۔

سوال ۴) لکڑہارے نے بور کا لڈو کیوں مانگا؟

۴۔ لکڑہارے نے بغیر مراد کی نیت سے غیر شعوری طور پر اپنی بھوک مٹانے کے لئے بور کا لڈو مانگا۔

سوال ۵) لکڑہارے کی بیوی اُسے کیا مانگنے کے لیے بار بار کہتی رہی؟

۵۔ لکڑہارے کی بیوی اُسے بار بار کہتی تھی کہ دولت مانگو۔

سوال ۶) بوڑھے کے نزدیک سب سے بڑی دولت کیا تھی؟

۶۔ بوڑھے کے نزدیک سب سے بڑی دولت خوشی تھی۔

سوال ۷) اس ڈرامے سے آپ کو کیا سبق حاصل ہوتا ہے؟

۷۔ اس ڈرامے سے یہ سبق ملتا ہے کہ ہمیں جنگلات کی بے تحاشہ کٹائی سے باز آنا چاہئے، تاکہ ماحول کا توازن برقرار رہے۔ انسان کے لئے سکون و اطمینان مادی چیزوں کے حصول میں نہیں بلکہ پاکیزہ خیالات و جذبات میں ہے۔ ہمیں ایک دوسرے کے جذبات کا خیال رکھنا چاہیے۔

----- ہمد م کاشمیری -----

ہمد م کاشمیری کا اصلی نام عبدالقیوم خان ہے اور آپ ہمد م تخلص کرتے ہیں۔ آپ کی پیدائش ۱۵ اپریل ۱۹۳۷ء کو شہید گنج سرینگر میں ایک اوسط درجے کے خاندان میں ہوئی۔ آپ کے والد کا نام نور محمد خان تھا جو پیشے سے ایک تاجر تھے۔ تعلیم مکمل کرنے کے بعد گورنمنٹ آرٹس ایمپوریم میں بہ حیثیت افسر ملازم ہوئے۔ ملازمت سے سبکدوش ہونے کے بعد ان سرینگر باغات برزلہ میں مقیم ہیں اور پوری لگن اور محنت سے زبان و ادب کی آبیاری کر رہے ہیں۔

ہمد م کاشمیری نے شعر گوئی کا آغاز ۱۹۵۸ء میں کیا۔ کشمیر کے جدید لب و لہجہ کے شاعروں میں آپ صفِ اول میں شمار ہوتے ہیں۔ آپ ایک کہنہ مشق شاعر ہیں۔ آپ نے نظمیں بھی کہی ہیں اور نعتیں بھی لکھی ہیں مگر آپ کا ادبی میدان غزل ہی ہے۔ آپ ایک معتبر غزل گو شاعر ہیں۔ آپ نے غزلوں میں ذاتی اور اجتماعی زندگی کے تجربات کو تخلیقی انداز سے پیش کیا ہے۔ آپ کے کلام میں لہجے کا نیا پن اور سلاست دیکھنے کو ملتی ہے۔ آپ کی غزلوں کا پہلا مجموعہ ۲۰۰۳ء میں شائع ہوا جسے آپ نے ”دھوپ لہوکی“ کے نام سے شائع کروایا۔ آپ کی ان غزلوں میں عصری کرب اور ظلم و تشدد کے علاوہ انسانی زندگی کے کئی پہلوؤں کی پختگی کے ساتھ بیان ہوئے ہیں۔

۳۔۔۔۔ سوالات کے جوابات ۔۔۔۔

۱۔ شاعر کو اس بات کا گمان نہیں تھا کہ شہر میں ہر طرف علم اور ترقی ہونے کے باوجود ظلم و تشدد، لاقانونیت اور بے چینی اور بے سکونی کا دور دورہ ہوگا۔

۲۔ یہ شاعر اپنے زمانے کے کرب اور تشدد کی عمدہ مثال ہے۔ شاعر کہتے ہیں کہ میری سر زمین پر کون کے ایسے نشانات لگے ہیں جو کسی بھی بارش سے دھوئے نہیں گئے۔ مطلب یہ کہ میرے وطن میں ایک عرصے سے خون خرابہ جاری ہے اور اس کے ختم ہونے کی کوئی بھی صورت نظر نہیں آرہی ہے۔ ہزاروں کوششوں کے باوجود بھی خونِ ناحق کے گرنے میں کوئی کمی واقع نہیں ہو رہی ہے۔

۳۔ صنعتِ تضاد سے مراد کسی شعر میں دو یا دو سے زیادہ ایسے الفاظ لانا جو معنی کے اعتبار سے ایک دوسرے کی ضد ہوں جیسے دن رات، اچھا بُرا وغیرہ۔

ہمدم کا شمیری کی دونوں غزلوں میں صنعتِ تضاد والے اشعار درج ذیل ہیں:

۱۔ میرے دائیں بائیں تھیں پر چھائیاں میرے ہاتھوں میں کوئی پتھر نہ تھا

۲۔ اس روشنی کے شہر میں ظلمت کرے گی راج

مجھ کو یقین تھا نہ تجھے ہی گمان تھا

۴۔ شاعر کہتے ہیں کہ رات کو چاند نکلنے کے بعد اُس کی چاندنی کا لطف اٹھانے کے لئے کوئی بھی اپنے چھت پر نہ آیا۔ مطلب یہ کہ سارے شہر میں بے چینی اور ظلم کا ایسا جادو چل گیا تھا کہ خوف و ہراس میں لوگ اپنے گھروں میں جیسے نظر بند ہو گئے تھے۔ کسی کو بھی چاندنی کا لطف اٹھانے کی جرأت نہ تھی۔ لوگوں کی نظروں نے ایسے دہشت ناک مناظر دیکھے تھے کہ چاندی کے نظارے کو ہی بھول گئے تھے۔

غزل نمبر ۱

ایسا نہیں کہ سر پہ سدا آسمان تھا میرا بھی شہر میں کبھی کوئی مکان تھا

شاعر مطلع میں زمانے کے مصائب و آرام کا تذکرہ کرتے ہوئے فرماتے ہیں کہ میرا وطن ہمیشہ ایسا نہیں تھا یہ بھی کبھی ایک خوشحال شہر کی طرح آباد تھا میں باضابطہ اپنے مکان میں رہا کرتا تھا، لیکن اب زمانے کے کرب و بلا سے میرے شہر کی حالت ناگفتی بہ ہوئی ہے اور اس عصری کرب سے میرا مکان بھی مجھ سے چھین لیا ہے اور میں کھلے آسمان تلے بے یار و مددگار ہوں۔

اس روشنی کے شہر میں ظلمت کرے گی راج مجھ کو یقین تھا نہ تجھے کو ہی گمان تھا

عصری کرب کو بیان کرتے ہوئے شاعر فرماتے ہیں اس بات کا کسی کو وہم و گمان نہ تھا کہ اس شہر میں تاریکی اور اندھیرے کا راج ہوگا۔ جبر و ظلم، تشدد، خوف اس شہر کو آگھیرے یہ کسی کو اندازہ نہیں تھا۔

دھویا نہیں گیا جو کسی برشنگال میں میری زمین پر وہ لہو کا نشان تھا

موجود دور کے ظلم و ستم کی مثال پیش کرتے ہوئے شاعر فرماتے ہیں کہ میری سر زمین پر بہت خون بہا ہے جو کس تیز بارش یا طوفان سے دھویا نہیں جاسکتا ہے۔ دنیا میں کتنے جھگڑے تھے جن کا حل نکالا گیا لیکن میری سر زمین پر خون خرابہ بند کرنے کی کوئی صورت دکھائی نہیں دیتی ہے۔

ہمدم کو چُپ لگی ہے زمانہ گزر گیا اس شہر خاموشی میں میں وہ صاحب اذان تھا

شاعر فرماتے ہیں کہ ایک عرصہ دراز سے میں خاموش بیٹھا ہوں حالانکہ اس قبرستان نما شہر میں تو وہ لوگوں کو بیدار کر کے فلاح کی طرف بلاتا تھا لیکن حالات نے مجھے وہ صدمے دئے ہیں کہ میں دم بخود ہو کر رہ گیا ہوں۔

غزل نمبر ۲

ایک بھی موسم میرے اندر نہ تھا اور آنکھوں میں کوئی منظر نہ تھا۔

شاعر خوشیوں اور امنگوں سے محروم زندگی کا ذکر کرتے ہوئے فرماتے ہیں کہ میری زندگی میں کوئی دلچسپ موسم موجود نہیں ہے۔ میری آنکھوں کے سامنے کوئی دلکش منظر نہیں ہے۔

میرے دائیں بائیں تھیں پر چھائیاں میرے ہاتھوں میں کوئی پتھر نہ تھا

انسان کی بے بسی کا اظہار کرتے ہوئے شاعر فرماتے ہیں کہ میری زندگی میں ہر طرف ظلم اور خوف و ستم کی پر چھائیاں تھیں میں ان سے لڑنا چاہتا تھا لیکن ان سے نبرد آزما ہونے کے لئے میرے ہاتھ میں ایک پتھر بھی نہ تھا یعنی میں بے بس تھا۔

خواب اپنے کیا حقیقت ہو گئے لمس کیسا تھا اگر پیکر نہ تھا

فرماتے ہیں کہ مجھے حقیقت بھی خواب جیسے دکھنے لگتی ہے مجھے لگتا ہے کہ کوئی وجود ہے جو میرے دکھوں اور مصیبتوں کا مداوا کرے لیکن یہ محض احساس ہے سچ تو یہ ہے کہ ایسا دنیا میں کوئی رفیق اور ہمدم موجود ہی نہیں ہے جو سچ مچ میرے دکھوں کا علاج کرے۔

چھا گیا تھا شہر پر افسوس کوئی چاند جب نکلا کوئی چھت پر نہ تھا

شاعر فرماتے ہیں کہ میرے شہر میں خوف و ہراس کی وجہ سے لوگ غمگین اور پریشان ہیں اور وہ ایسے خوف زدہ ہیں جیسے کسی نے ان پر جادو کیا ہو۔ اب خوف و ہراس کی وجہ سے چاند نکلنے پر کوئی چھت پر آنے کی جرات نہیں کر سکتا۔

اک صد اگو نچی مکاں میں دیر تک کیا تھا یہ ہمد کوئی در پر نہ تھا

کشمیر کے حالات کی ترجمانی کرتے ہوئے ہمد کا شمیری اپنے آپ سے مخاطب ہو کر فرماتے ہیں کہ مکان میں دیر تک کوئی چپختا رہا۔ بظاہر تو دروازے پر کوئی دکھائی نہیں دیتا تھا دروازے پر کوئی موجود نہ ہونے پر بھی گھر کے اندر چپختیں گونج رہی ہیں۔

----- شیب رضوی -----

سید محمد شیب رضوی کی ولادت ۲۵ جون ۱۹۳۵ء کو ضلع بارہ بنکی اتر پردیش میں ہوئی۔ ابھی پانچ سال کے تھے کہ والد سید مواعظ حسین رضوی کا انتقال ہوا۔ دینی تعلیم گھر پر ہی اپنی والدہ سے حاصل کی۔ اسکے بعد آپ نے عربی میں مولوی فاضل تفسیر اور علمیت کے امتحانات پاس کئے۔ فارسی میں آپ نے منشی اور کامل کے امتحانات پاس کئے۔ اسکے بعد لکھنؤ سے صدر الافاضل کی سند حاصل کر کے اردو میں ادیب ماہر کا امتحان پاس کیا۔ ۱۹۵۹ء میں طبیہ کالج لکھنؤ سے ایم۔ بی۔ ایس کی ڈگری حاصل کی اور نومبر ۱۹۶۳ء میں آپ کا تقرر گورنمنٹ طبیہ کالج سرینگر میں ہوا۔ ۱۹۶۸ء میں آپ نے سرینگر میں ہی شادی کی اور یہیں مستقل سکونت اختیار کی۔ بعد میں آپ طبیہ کالج میں اپنی خدمات انجام دیتے ہوئے میڈیکل آفیسر کے منصب سے سبکدوش ہوئے۔

شیب رضوی ایک اچھے شاعر ہونے کے ساتھ ساتھ اعلیٰ درجے کے نثر و نگار بھی ہیں۔ شعر و شاعری کی ترغیب گھر کے ادبی ماحول سے ملی۔ آپ کی شخصیت لکھنؤ کے ادبی ماحول میں پروان چڑھی اس لئے آپ کا لہجہ ٹکسالی ہے اور زبان و بیان پر بھی آپ کو دسترس حاصل ہے۔ آنے بیشتر اصنافِ سخن میں طبع آزمائی کی جن میں غزلیں، نظمیں، مرثیے، سلام، نعت، قطعات اور رباعیات قابل ذکر ہیں۔ آپ کی شاعری کارنگ اخلاقی اور تہذیبی ہے۔ آپ کے لہجے میں متانت اور اسلوب میں سادگی

ہے۔ ”آتشِ چنار“ ، ”حروفِ فروزاں“ ، ”بچوں کے مشاعرے“ اور ”زیرِ ترتیب مجموعہ کلام ”لہو لہو غزل“ آپ کے شعری مجموعے ہیں۔ اس کے علاوہ آپ نے رسول میر کے کشمیری نغموں اور نظموں کے کچھ منظوم ترجمے بھی کئے ہیں۔ نثر نگاری میں آپ انشائیے اور مقالے تحریر کرنے میں خاصی دسترس رکھتے ہیں۔ آپ کی نثر عام طور پر سادہ اور سلیس ہوتی ہے۔

۳۔۔۔۔۔ سوالات کے جوابات ۔۔۔۔۔

۱۔ کتنی بھوکی ہے کتنی پیاسی ہے سب گئے شمعِ دل جلائے ہوئے

زندگی دشتِ کربلاسی ہے خیمہ خیمہ بہت اداسی ہے

ہماری شرط کہ ہم پر ہوسایہ رحمت

تمہاری ضد کہ کوئی سر گھلا رکھنا

۲۔ شاعر اپنی زندگی میں چین و سکون کونہ پا کر بہت اداس ہو گیا ہے۔ اپنے آپ کو مطمئن کرنے کے لئے وہ اپنا گھر چھوڑ کر رات کی خاموشی میں نکل چکا ہے لیکن اپنے بچوں سے دروازہ گھلا رکھنے کی نصیحت کرتا ہے تاکہ اگر اس کی لا اُبابی طبیعت اُسے رات کے سناٹے سے بھی واپس لیکر آئی اور اُسے سکون حاصل نہ ہو تو کم سے کم اُس کے گھر کا دروازہ اُس کے لئے بند نہ ہو اہو۔ مطلب یہ کہ شاعر کو کہیں چین و سکون حاصل نہیں ہو پاتا ہے۔

۳۔ اس شعر میں اس واقعہ کی طرف اشارہ کیا گیا ہے جب کربلا کے معرکے کے بعد حضرت امام حسینؑ کی بہن حضرت زینبؑ کے ساتھ یزیدی فوج نے بُرا سلوک کیا۔ انہیں ننگے سر اور ننگے پیر ملکِ شام کی طرف چلنے کا حکم دیا۔

غزل نمبر ۱

کتاب بند سہی حرف تر کھلا رکھنا
مباحثے ہمیشہ ہی در کھال رکھا
شیب رضوی اپنے محبوب سے فرماتے ہیں کہ اے میرے محبوب! اگرچہ محبت کی کتاب بند ہو گئی
ہے تو کم از کم سلام و کلام کا دروازہ ہمیشہ کھلا رکھنا کیونکہ مجھے تسلی اور اطمینان حاصل ہو اور میں اپنے
شکوہ و شبہات کو دور کر سکوں۔

سکوتِ شب سے بھی اکتا کے لوٹ سکتا ہوں
میں کہہ کے آیا دہوں بچوں سے، گھر کھلا رکھنا
شاعر (شیب رضوی) فرماتے ہیں کہ محبوب کے فراق اور جدائی کی وجہ سے پریشان ہو کر میں رات کی
تنہائی میں سکون کی تلاش میں نکلا ہوں۔ لیکن گھر والوں سے کہہ دیا کہ دروازہ کھلا رکھنا۔ ہو سکتا ہے کہ
رات کی خاموشی سے بھی تنگ آ کر گھر واپس لوٹ آؤں۔

ہماری شرط کہ ہم پر ہو ساتھ رحمت
تمہاری ضد ہے کی کونے میں سر کھلا رکھنا
شیب رضوی نے اس شعر میں صنعت تلمیح استعمال کی ہے اور فرماتے ہیں کہ جس طرح حضرت
زینبؓ کو کربلا کے میدان میں کھلا سر رکھنے پر مجبور کیا گیا اگرچہ وہ رحم کی مستحق تھی لیکن اس کے برعکس
بھی انکے ساتھ سختی کا معاملہ کیا گیا۔ گویا کہ شاعر محبوب کے نگاہ کرم کا حقدار تھا لیکن وہ بھی ضدی اور
بے رحم بن کر دنیا کے مصائب کا وار سہنے کے لئے اپنے عاشق کو دنیا میں سر کھلا رکھنے کے لئے کہتا ہے۔

شکستگی ہوئی ظاہر تو موت لازم ہے۔ کھلی ہواؤں کے دھارے پہ کھلا رکھنا
 شاعر محترم شیب رضوی فرماتے ہیں کہ جب ناامیدی اور شکستگی اپنے عروج کو پہنچ جاتی ہے تو موت
 زندگی کے دروازے پر دستک دیتی ہے۔ اور کھلی ہوا کی طرح اپنے ساتھ لے جاتی ہے۔ اس لئے
 انسان کو ہمیشہ امید کے دامن کو پکڑ کر مصائب کا ڈٹ کر مقابلہ کرنا چاہئے ورنہ مصائب اس کو اپنے
 ساتھ لے کر بہا دیں گے۔

کسی کا ہاتھ بڑھے یا کھچے یہ اس کا نصیب ہمارا فرض ہے دستِ ہنر کھلا رکھنا
 شیب رضوی فرماتے ہیں کہ انسان اگر کسی فن سے واقف ہو تو اس کا فرض یہ ہے کہ اُسے ہمیشہ علم و
 ہنر کی تعلیم دینے کے لئے خود کو تیار رکھنا چاہئے یہ اور بات ہے کہ اس کے پاس علم و ہنر کی تعلیم سیکھنے
 کے لئے کوئی آئے یا نہ آئے۔ یہ سیکھنے والے کا نصیب ہے۔ لیکن ہنرمند کی ذمہ داری ہے کہ اُسے
 ہمیشہ اپنے فرض کو انجام دینا چاہئے۔

غزل نمبر ۲

کتنی بھوکی ہے کتنی پیاسی ہے زندگی دشتِ کربلا کی سی ہے
 شیب رضوی ظالم دنیا اور زمانے کی عکاسی کرتے ہوئے فرماتے ہیں کہ دنیا بہت ظالم ہے۔ یہ کس
 قدر اذیت ناک اور تکلیف دہ بن گئی ہے۔ ہر طرف تناؤ ہے۔ یہ ایک بھوکے اور پیاسے کے
 مانند کمزوروں اور بے گناہوں کا خون بہاتی ہے۔ اس ظالم دنیا میں جینا اور اس سے مقابلہ کرنا کربلا
 سے کم مشکل نہیں ہے۔ گویا یہ زندگی نہیں کر بلاں کا میدان ہے۔

سب گئے شمع دل جلائے ہوئے خیمہ خیمہ بہتا اسی ہے۔

شیبِ رضوی نے اس شعر میں واقعہ کربلا کی اس وقت کی تصویر کھینچی ہے جب حضرت امام حسین کے سب رفقاء ایک ایک کر کے شہید ہو جاتے ہیں۔ یہاں تک کہ حضرت امام حسین نے بھی جامِ شہادت نوش کیا۔ جب سب شہید ہو گئے تو تپتے ہوئے ریگستان میں اُداسی چھا گئی اور ایک ایک خیمہ ویران نظر آنے لگا۔

اُس نے کتنی لطیف بات کہی خود شناسی خدا شناسی ہے۔

شیبِ رضوی نے اس شعر میں خود شناسی کو خدا شناسی کہہ کر ایک معروف قول ”مَنْ عَرَفَ نَفْسَهُ فَقَدْ عَرَفَ رَبَّهُ“ کا خوبصورت ترجمہ کیا ہے۔ شاعر فرماتے ہیں کہ کسی اللہ والے نے کتنی عمدہ بات کہی کہ جس نے اپنی ذات کو پہچان لیا وہ یقیناً خدا کی عظمت اور بڑائی کو جان لے گا۔ اگر یہ ایک نرم اور لطیف بات ہے لیکن اپنے اندر بہت بڑی حقیقت چھپائے ہوئے ہے۔

پھیل جائے تو ایک کتاب بنے بات کہنے میں جو ذرا سی ہے

شیبِ رضوی اس شعر میں فرماتے ہیں کہ زندگی کی کہانی اگرچہ مختصر ہے لیکن اگر اس مختصر سی زندگی کا حال بیان کیا جائے تو ایک بڑی کتاب بن سکتی ہے اس کی وضاحت کی جائے تو مضمون کے صفے بھرے جاسکتے ہیں۔

یا

خود شناسی خدا شناسی ہے۔ یہ جملہ اگر دیکھنے میں بہت چھوٹا ہے لیکن اگر اس کی تعریف کی جائے تو ایک بڑی کتاب تیار ہوگی۔ خدا کی عظمت اور مذہب کی ساری صداقتیں اس مختصر سے جملے میں پوشیدہ ہیں۔

زندگی خودکشی نہ کر لے کہیں ہر تمنا خفا خفا سی ہے

شبِ رضوی اس شعر میں فرماتے ہیں کہ دنیا میں انسان کی اکثر آرزوئیں ادھوری رہتی ہیں۔ انسان کی کوئی خواہش، کوئی مراد پوری نہیں ہو پاتی ہے لہذا ایسا لگتا ہے کہ زندگی خود ان حالات سے تنگ آ کر خودکشی نہ کر بیٹھے۔ شاعر کو سخت مایوسی کا شکار ہو کر ایسا سوچتا ہے کہ نہ صرف وہ بلکہ ساری دنیا خودکشی کرنے کو تیار ہے۔

-----مرزا محمد یسین بیگ (۱۹۴۳)-----

مرزا محمد یسین بیگ اردو کے جدید شاعروں میں شمار ہوتے ہیں۔ آپ ۱۹۲۳ء میں جموں میں پیدا ہوئے۔ ابتدائی تعلیم حاصل کرنے کے بعد جموں سے ہی ایف۔ اے۔ کا امتحان پاس کیا اور جموں و کشمیر اکادمی آف کلچر اینڈ لنگویجز میں لائبریرین کی حیثیت سے ملازم ہوئے۔ علی گڑھ یونیورسٹی سے بی۔ اے۔ کا امتحان پاس کرنے کے بعد آپ ریاستی سرکار کے مختلف محکموں میں کام کرتے رہے۔

مرزا محمد یسین بیگ نے شاعری کا آغاز کالج کے زمانے سے ہی کیا۔ آپ کی غزلوں کا پہلا مجموعہ ”شاخِ صنوبر کے تلے“ ۱۹۶۲ء میں شائع ہوا۔ آپ کی غزلوں کا محبوب ترین موضوع حسن و عشق ہے۔ آپ کی زبان اور آپ کا بیان لطیف ہے۔ آپ کا ذہن سلجھا ہوا ہے اور فکر کی گہرائی اور احساس کی فراوانی سے آپ کے کلام میں شدت پیدا ہو گئی ہے۔ آپ کی شاعری کا دوسرا مجموعہ ان نظموں پر مشتمل ہے جو ”دہر آشوب“ کے عنوان سے ۱۹۹۱ء میں شائع ہوا۔ آپ نے شاعری کی اکثر اصناف میں طبع آزمائی کی لیکن آپ کی انفرادیت نظموں میں کھل کر سامنے آئی ہے۔ آپ نے نظموں میں عصری مسائل کی بھرپور ترجمانی کی ہے۔ آپ کی بعض نظمیں گیت کا سا لطف دیتی ہیں۔ آپ کے ہاں پائے والے استعارے اور پیکر بڑے دلکش ہیں۔ آپ اردو کے علاوہ دوگری اور پنجابی زبانوں میں بھی شعر کہتے

ہیں۔ مختلف زبانوں کے سنگم نے آپ کی تحریر کو رنگین اور دلکش بنا دیا ہے۔

۳۔ سوالات کے جوابات ----

۱۔ اس نظم میں ایسی ذہنی کیفیت کی تصویر کشی کی گئی ہے جو مایوسی اور بے بسی کے عالم میں حیران و

پریشان ہے اور اپنے مقصد کے حصول میں ٹوٹی امید لئے بیٹھا ہے

۲۔ قیس سے مراد عصر حاضر کس وہ نوجوان ہے جو معاشی بد حالی کا شکار ہے اور محمل لیلیٰ سے مراد وہ

ذریعہ معاش ہے جو اطمینان بخش اور خوشحال زندگی کے لئے لازمی سمجھا گیا ہے۔

----- قطعہ -----

قطعہ کے لغوی معنی ٹکڑے کے ہیں، ادبی اصطلاح میں قطعہ اس مسلسل نظم کو کہتے ہیں جس میں ایک خیال یا ایک واقعہ دو یا دو سے زیادہ اشعار میں اس طرح موزوں کیا گیا ہو کہ ہر شعر کا مطلب دوسرے شعر پر موقوف ہو۔ قطعات غزل کی ہیئت میں لکھے جاتے ہیں۔ مصرعے پہلے شعر کے دوسرے مصرعے کے ہم قافیہ ہوں گے۔ قطعہ کے اشعار کی تعداد کم از کم دو ہوتی ہے اور زیادہ کی تعداد مقرر نہیں۔ زیادہ تر شعراء نے چار مصرعوں پر مشتمل قطعات کہے ہیں۔ قطعہ الگ بھی لکھا جاسکتا ہے اور کسی غزل کا ایک حصہ بھی ہو سکتا ہے۔ اس میں ہر قسم کے مضامین بیان کئے جاتے ہیں۔ عام طور سے واقعات میں اخلاقی اور نصیحت آمیز باتیں لکھی جاتی ہیں۔ اگر شاعرانہ کمال کے ساتھ اس میں کوئی بلند اور گہرا خیال پیش کیا جائے تو بقول اختر انصاری ”یہ ایک سمٹی ہوئی نظم ہے“۔

قطعہ کو پہلے ایک صنفِ شاعری کی حیثیت سے نہیں برتا گیا مگر جب غالب، حالی، اکبر اور اقبال

جیسے بڑے شاعروں سے تو اتر کے ساتھ قطعات لکھے تو انیسویں صدی کے آخر میں اسے الگ صنفِ سخن

کا مقام ملا اور یہ صنف بہت مقبول ہونے لگی۔ دورِ جدید میں اقبال، اکبر، شبلی، ظفر علی خان، اختر شیرانی اور اختر انصاری نے بہترین قطعات کہے ہیں۔ زمانے کے ساتھ ساتھ قطعہ اردو شاعری میں اپنا مقام متعین کرتا گیا اور اسے بہت اہمیت دی جانے لگی۔

----- مولانا الطاف حسین حالی ----- (۱۸۳۷ - ۱۹۱۴)

اردو شاعری کے پہلے باقاعدہ نقاد اور پہلے سوانح نگار مولانا الطاف حسین حالی ۱۸۳۷ء میں پانی پت میں پیدا ہوئے۔ آپ کے والد کا نام خواجہ ایزد بخش تھا۔ شیرخوارگی میں ہی ماں کا انتقال ہوا اور جب آپ نو برس کے ہوئے تو والد نے بھی وفات پائی۔ پھر آپ کی تعلیم و تربیت کی ذمہ داری آپ کے بڑے بھائی خواجہ امداد حسین اور آپ کی بہنوں نے اٹھائی۔ قرآن پاک حفظ کرنے کے بعد عربی اور فارسی میں اچھی دستگاہ حاصل کی۔ ۱۸۵۳ء میں آپ کی شادی ہوئی اور شادی کے کچھ مہینے بعد ہی آپ علم کے حصول کے لئے دلی چلے

آئے۔ ۱۸۵۵ء میں واپس لوٹے اور بچوں کو پڑھانے لگے۔ ۱۸۵۷ء میں جب حالات مخدوش ہوئے تو کچھ مدت تک گوشہ نشینی اختیار کی اور ۱۸۶۱ء میں دوبارہ دلی چلے گئے۔ وہاں نواب شیفتہ سے ملاقات ہوئی اور انہوں نے آپ کو اپنے بچوں کا اتالیق مقرر کیا۔ شیفتہ ہی کی وساطت سے آپ کی ملاقات مرزا غالب سے ہوئی اور آپ کے ان کے شاگرد بن گئے۔ غالب اور شیفتہ کے انتقال کے بعد آپ لاہور چلے گئے جہاں گورنمنٹ بک ڈپو میں ملازم ہوئے۔ اسی زمانے میں آپ کی ملاقات سرسید احمد خان سے ہوئی اور سرسید کی علی گڑھ تحریک میں دل و جان سے شریک ہوئے۔ آخری عمر میں حیدرآباد سے ادبی وظیفہ ملنے لگا تو آپ نے ملازمت کو خیر باد کہا اور پانی پت آکر ادبی خدمت میں مشغول ہو گئے۔ یہاں پر ہی ۳۱ دسمبر ۱۹۱۴ء کو آپ نے وفات پائی۔

مولانا حالی اردو ادب کے پہلے سوانح نگار اور نقاد تسلیم کئے جاتے ہیں۔ آپ اردو کے بڑے شاعر ہی نہیں بلکہ بڑے ادیب بھی تھے۔ آپ پہلے شاعر ہیں جس نے مقصدی شاعری کے فن کو برتا اور اور عروج تک پہنچایا۔ آپ کے کلام کا مقصد قوم کی اصلاح تھا اس لئے آپ نے سادہ اور آسان الفاظ کا استعمال کیا۔ آپ کا کلام تاثیر سے بھرپور ہے۔ آپ پہلے شاعر ہیں جنہوں نے ادب کو زندگی اور اس کے مسائل سے جوڑا۔ آپ کی نظموں میں سادگی، روانی، یک رنگی اور تسلسل موجود ہے۔ آپ فطری شاعری کے بڑے حامی تھے۔ آپ کی نثر نگاری آپ کی نظم نگاری پر سبقت رکھتی ہے۔ ”حیاتِ سعدی“، ”یادگارِ غالب“ اور ”حیاتِ جاوید“ لکھ کر آپ نے اردو ادب میں سوانح نگاری کی باقاعدہ بنیاد ڈالی اور اسی طرح ”مقدمہ شعر و شاعری“ لکھ کر تنقید نگاری کی باقاعدہ بنیاد رکھی۔ مجموعی طور پر ایک شاعر اور ادیب کی حیثیت سے حالی ایک کامیاب انسان تھے۔

۳۔ سوالات کے جوابات ----

۱۔ اس کہانی کے نظم کرنے سے مولانا حالی کا مقصد یہ ہے کہ ہمیں اپنے ماتحتوں اور نوکروں سے حسن سلوک کے ساتھ پیش آنا چاہئے اگر ہمارا رویہ اور طریقہ کار جاہلانہ ہو تو ہمارے نوکر اور ماتحت خود غرض اور بے وفا ہو جاتے ہیں۔

۲۔ ہمیں اپنے ماتحتوں سے ہمدردی اور حسن سلوک سے پیش آنا چاہئے۔

۳۔ مولانا حالی بیان کرتے ہیں کہ ایک شخص جس کے یہاں بہت سے نوکر کام کرتے تھے۔ یہ شخص یعنی مالک اپنے نوکروں پر ظلم کرتا تھا۔ ان سے کسی قسم کا لحاظ اور نرمی نہ برتا تھا۔ بات بات پر انہیں سزا دیتا تھا۔ یہ نوکر دن بھر کام کرتے رہتے تھے اور ان کی بے لوث خدمت کے باوجود وہ ان سے خوشی سے پیش نہ آتا تھا۔ انعام کی تو بات ہی نہیں تھی۔ اگر کبھی وہ کسی قسم کی رعایت طلب کرتے تو مالک اسی وقت ان سے وہ شرائط نامہ دکھانے کو کہتا جو ہر ایک نوکر کے پاس رہتا تھا اور جس میں