FOREST SOCIETIES AND COLONIALISM

QNo1:- Discuss how the changes in forest management in the colonial period affected the following people:

1) **Shifting Cultivation**: One of the major impacts of the forest managements during the colonial period was on the lives of shifting cultivators. For centuries these cultivators practiced ‘slash and burn agriculture’. European foresters regarded this practice harmful for the forests. Therefore, the British Government decided to ban the shifting cultivation and reserved these forests for themselves. As a result many communities were forcibly displaced from their homes in the forests. Their centuries old profession of shifting agriculture was stopped once for all. Some had to change occupations while some resisted through large and small rebellions against government.

2) **Nomadic and Pastoralists communities**: The reservation of forest areas by the British Government also sealed the fate of many nomadic and pastoral communities who lost their means of livelihood. Earlier these people and their cattle depended totally on the forest from which they were deprived because of the new forest management. Some of these communities began to be called ‘Criminal Tribes’ and were forced to work in factories, mines and plantations under government supervision.

3) **Firm trading in timber/forest produce**: The reservation policy of the British ruined the prospects of several firms trading in timber and forest produce. They could no longer cut trees and collect timber because that was badly now needed by the British to build their ship and railway sleepers. Neither could they get now other forest products like herbs, fibers, gums, bamboos etc. to trade with. There trading career which was based on forest produce was sealed forever.

4) **Plantation owners**: Large areas of natural forests were cleared by the plantation owners who were mainly Europeans. They were allowed by the British to enclose such areas, clear the forest and plant tea, coffee and rubber to meet Europe’s growing demand of these materials.

5) **Kings/British officials engaged in shikhar**: While the forest dwellers were deprived of their right to hunt deer, partridges and other small animals, the Indian Kings and British officials were allowed to hunt freely in the reserved forests. Under the colonial rule, the hunting or shikhar became a sport. A large numbers of tigers, leopards, wolves were killed as sporting trophy.

QNo2:- What are the similarities between the colonial management of the forest in Bastar and Java?

**Ans:-** Colonial management in Bastar and Java were quite similar to each other. The Dutch started colonial forest management in Java just as the British had in India, for timber. The villagers in Bastar were allowed to stay on the reserved forests if they provided free labour for timber firms; likewise the Blandongdiensten system in Java demanded free labour from forest villagers for cutting and transporting wood. Just as the Kalangs uprising in Java was suppressed in 1770, the Bastar revolt was also suppressed in India by the British in 1910.

QNo3:- Between 1880 and 1920, forests cover in Indian subcontinent declined by 9.7 million hectares, from 108.6 million hectares. Discuss the role of the following factors in this decline:

1) **Railways**: Railways were a necessary mode of transport for colonial trade and movement of troops. To run the locomotives wood was needed as fuel and also for railway sleepers. As railways spread through India, a huge number of trees were felled. In the Madras Presidency itself, 35,000 trees were cut annually for sleepers in the 1850s.

2) **Shipbuilding**: By the end of 19th century, oak forest in England had almost disappeared. This created for the shortage of timber for the Royal Navy warships. A large numbers of timber began to be exported from India to England. This cutting of trees year after year caused deforestation on a massive scale.

3) **Agricultural expansion**: During British rule in India cultivation expanded rapidly. Food was required more to feed the growing population of India and raw material for industrial purposes. Because of all these reasons, the cultivators continued to expand the boundaries of their cultivated fields which resulted in the depletion of the forest areas.

4) **Tea/Coffee plantation**: The British encouraged the production of commercial crops like jute, sugar, cotton, tea, wheat, coffee etc. These crops were required by the Europe to feed its urban growing population
as well as to increase its industrial productions. So, large areas of natural forests were cleared to increase commercial farming during this period.

5) **Adivasis and other peasant users:** In spite of different forest laws, the Adivasis and other peasant users, whenever they found any opportunity continued cutting trees for cooking their food, making their houses etc. In this way these people were also responsible to some extent for the continuous decline of forest.

**QNo4:** Why are forests affected by wars?

**Ans:**

- Forests are affected by wars due to various reasons:
  
  1) The defending armies hid themselves and their war materials under the cover of forests to avoid detection. As such enemy forces also target forest areas as a general practice.
  
  2) To meet war needs, sometimes forests are cut indiscriminately.
  
  3) Fearing the capture of forest areas by the enemy, the existing government themselves cut down the trees recklessly. This policy is popularly known as ‘a scorched earth’ policy.

**QNo5:** How did industrialization effect forests?

**Ans:**

- Industrialization effect forests by following ways:
  
  1) With the emergence and growth of Industrialization in European countries, vast areas of forests were cleared to serve as raw materials for the industries.
  
  2) The factories cause air pollution. The air evaporates into the clouds which then come down as acid rain destroying thousands of forests.

**QNo6:** State reasons for extension of cultivation?

**Ans:**

- The reasons for extension of cultivation in the colonial period are:
  
  1) The production of commercial crops like tea, coffee, indigo and rubber got encouragement by the British to meet Europe’s growing demand of these materials.
  
  2) They wanted to convert forests into fields for increasing land revenue.
  
  3) There were many forest rules made during the colonial period by the British which forced the nomads, forest dwellers and shifting cultivators to leave their traditional occupation and settle down.

**QNo7:** Explain the uses of forests for people and government in 19th and 20th centuries?

**Ans:**

- People needed forests to get fuel, fodder, medicine, wood to built houses and agricultural implements etc. Bamboo was used for making fences, baskets and umbrellas.
  
  On the other hand the government wanted forest to built Royal Navy ships and railway sleepers. Tall and straight trees having hard wood like Teak and Sal were used for the said purpose.

**QNo8:** What was the reaction of the tribal people to the British forest policy?

**Ans:**

- The British extended their control over all forests and declared those forests as state property. Some forests were classified as Reserved Forests for they produced timber which the British wanted. In these forests people were not allowed to move freely, practice shifting cultivation, collect fruits or hunt animals.

  Through the 19th and 20th century, tribal groups in different parts of the country rebelled against the government for change in laws. Sidhu and Kanu rebelled in Santhal Parganas, Birs of Chottanagpur, Alluri Sitarama Raju of Andhra Pradesh and Bastar rebellion were some of the reactions of the tribal people to the British forest policy.
ELECTORAL POLITICS

QNo1) Describe the role of election commission in ensuring free and fair elections?

Ans: The election commission of India has to perform so many functions in order to hold free and fair elections.

1) Election commission takes decisions on every aspect of conduct and control of elections from the announcement of elections to the declaration of results.

2) It implements the code of conduct and punishes any candidate or party that violates it.

3) During the election period, the Election Commission can order the government to follow some guidelines, to prevent use and misuse of governmental power to enhance its chances to win elections, or to transfer some government officials.

Qno2) Describe in detail the various steps in the election process?

Ans: Election process involves so many steps:

1) Notification by the Election Commission of India: The election process begins as soon as the dates for the elections are announced.

2) Short listing of the Candidates: Then different political parties select their candidates keeping in mind the prospect of winning the election.

3) Filling the Nomination Papers: Then different candidates fill their nomination papers in the election office before the last date meant for the same.

4) Rejection of Nomination: In this process an eligible candidates are rejected from the nomination list and only eligible and popular candidates are selected for final list.

5) Allotment of Symbols: National parties have their permanent symbols but other parties and independent candidates are also allotted symbols so that even the ordinary voter can recognize the different parties and candidates very easily.

6) Issuing of Election Manifestoes: Then the different parties print their election manifestoes so that the voters may easily know their programmes and policies very closely.

7) Campaigning: Then begins campaigning for different political parties which includes politics, meetings, and speeches etc.

8) Polling: Then in the specific day the voting is on the basis of the Electronic Voting Machines.

9) Counting of Votes and Declaration of Results: After the voting is over, the EVMs are sealed and taken to the secured counting centres. There the votes are counted and soon after the result is declared.

10) Filing of Election Petition: If any candidate is not satisfied with the election results, he can go to the court of law to redress his complaint.

Qno3) What are the various challenges to free and fair elections?

Ans: The challenges to free and fair elections are:

1) A few candidates may win purely on the basis of money power and unfair means.

2) In some parts of the country, candidates with criminal connection have been able to push others out of the electoral race and to secure a ‘ticket’ from major parties.

3) Some families who dominate political parties distribute tickets to their relatives.

Due to these challenges exist in Indian democracy citizens, social activists and organizations have been demanding reforms in our electoral system.

Qno4) What is an Electoral Constituencies?

Ans: India is divided into different areas for purposes of elections on the basis of a roughly equal population living within it. These areas are called electoral constituencies. For Lok Sabha election, the voters who live in an area elect one representative from each constituency who is called as Member of Parliament (MP).
Qno5) How many Assembly Constituencies are in J&K?

Ans: India is divided into different areas for purposes of elections. These areas are called electoral constituencies. The voters who live in an area elect one representative. Jammu & Kashmir have 87 MLAs. Therefore Jammu & Kashmir have 87 constituencies.

Qno6) Why are modern democracies indirect?

Ans: The modern democracies indirect because the modern nation states are very big in size which are over a vast area having a huge population as their citizens. In such conditions it is quite impossible for all the people to directly take part in the administration of their state.

Qno7) What do you mean by the word ‘Population Participation’ in elections?

Ans: People’s participation in election is usually measured by voter turnout figures. Turnout indicates the percentages if eligible voters who actually cast their vote. If the turnout figure increased over the years that participation is called as popular participation in elections.

Qno8) What is a coalition government?

Ans: A coalition government is a cabinet of a parliamentary government in which no clear majorities appear through general elections. To deal with a situation parties either form coalition cabinets, or minority cabinets which may consists one or more parties.

Qno9) Why are elections necessary in a democracy?

Ans: Elections are necessary in a democracy because of the following reasons:

1) All the citizens in a modern democracy cannot run the administration. Only their representatives can do it for them. In order to choose such representatives the elections are must.
2) Through elections alone the people can get rid of their existing cruel and unpopular government and in place they can elect a new popular government.
3) Without the elections a democratic government cannot be set up. It has been rightly said, “No elections, no democracy.”

Qno10) What do you mean by direct and indirect elections?

Ans: The elections to the Lok Sabha, State Legislative Assemblies, Panchayats & Municipalities are direct elections. In these elections the electors directly participate in the election by casting their vote.

The elections to the office of the President, Vice President & Rajya Sabha are indirect elections in the sense that only the MLAs & MPs cast their votes on behalf of the general electorate.

Qno11) What is a General Election?

Ans: The election to the Lok Sabha is called the General Election. It is held after every five years. The entire country is divided into 543 constituencies & from each constituency one member is elected on the basis of first past the post system.

Qno12) What is a By-Election?

Ans: By-Election is a special election held in a constituency to fill a political office that has become vacant in case of death or resignation of a member of Lok Sabha.

Section A: Q. No. 1.

Q No.i. What are the controls affecting the climate of India?

Ans. The controls affecting the climate of India are: latitude, altitude, pressure and wind systems, distance from the sea, ocean currents and relief.

Q No.ii. Why does India have a monsoon type of climate?

Ans. The climate of India is strongly influenced by monsoon winds that is by south –west monsoons and north– east monsoons. Hence, it has a monsoon type of climate.

Q No.iii. Which winds account for rainfall along the Malabar Coast?

Ans. The south-west monsoon winds are responsible for rainfall along the Malabar Coast.

Q No.iv. Define monsoons. What do you understand by the “break” in monsoon?

Ans. Monsoon is the system of winds characterized by a seasonal reversal of wind direction. This reversal of wind direction implies winds blowing from sea to land in summer season and from land to sea during winters. ‘Break’ in monsoon refers to the wet and dry spells of the monsoon. In other words, the
monsoon rains take place for a few days at a time. These breaks in monsoon are related to the movement of the monsoon trough.

Q No.v. Why monsoon is considered a unifying bond?
Ans. The Indian landscape, its animals and plant life, its entire agricultural calendar and the life of the people, including their festivities, revolve around the monsoon. Year after year people of India from north to south and from east to west wait eagerly for the arrival of the monsoon. These monsoon winds hinder the whole country by providing water to set agricultural activities in motion.

Q No.vi. What factor controls the climate of J&K in winter?
Ans. The factors that control the climate of J&K in winter are latitude, altitude, and distance from the sea, prevailing winds and relief.

Q No.vii. Which factor accounts for low rainfall in Ladakh?
Ans. The Ladakh region possesses cold and dry climate and precipitation is mainly in the form of snowfall. The other reason is that it lies on the rain-shadow area of the Himalayas (Zanskar range). This position is responsible for the low rainfall in Ladakh region because leeward side receives less precipitation as compared to the windward side.

Q No.2: Why does the rainfall decrease from the east to west in Northern India?
Ans. The amount of rainfall decreases from east to west in Northern India because of the progressive decrease in the humidity of the winds. As the moisture-bearing winds of the Bay of Bengal branch of the southwest monsoon move further inland, they exhaust most of the moisture they carry along with them. This consequently leads to a gradual decrease in the amount of rainfall from east to west.

Section- B

Q No.3. Give reason why.

a). Seasonal reversal of wind direction takes place over the Indian subcontinent?
Ans. The pressure and wind conditions over India are unique. During winter, there is a high pressure area on north of the Himalayas. Cold dry winds blow from this region to the low pressure areas. Over the oceans to south. In summer, a low pressure area develops over the interior Asia as well as over north western India. This causes a complete reversal of the direction of winds during summer.

b). The bulk of rainfall in India in concentrated over a few months
Ans. The rainfall received by India is largely due to the south-west monsoon winds. The duration of the monsoon is between 100 to 120 days. Hence, the bulk of rainfall received by the country is concentrated over a few months.

c). The Tamil Nadu coast receives winter rainfall
Ans. During the winter season, north-east trade winds prevail over India. They blow from land to sea and hence, for most part of the country, it is a dry season. However the Tamil Nadu coast receives winter rainfall due to these winds. This is because in this region these blow from sea to land, thereby carrying moisture along with them.

d). The delta region of the eastern coast is frequently struck by cyclones
Ans. The delta region of the eastern coast of India is frequently struck by the cyclones. This is because the cyclonic depressions that originate over the Andaman sea are brought in by the sub-tropical easterly jet streams blowing peninsular India during the monsoon as well as during October to November period.

e). Parts of Rajasthan, Gujarat and the leeward side of the Western Ghats are drought-prone.
Ans. Parts of Rajasthan, Gujarat and the leeward side of the Western Ghats are drought-prone because of The scanty rainfall received by these regions during the monsoon rains. The progressive decrease in the humidity of the winds of Bay of Bengal branch causes the amount of rainfall to decrease from east to west in northern India. As the leeward side is the rain-shadow area, the regions lying in this region receive very little rain from the Arabian Sea branch. It is the windward side of the Ghats that receive the maximum rain.

Q No.3. Describe the regional variations in the climatic conditions of India with help of suitable examples?
Ans. Despite the overall unity accorded by the monsoons, there are visible regional variations in climatic conditions within India. Regardless of the moderating influences of the Himalayas in the north and
the sea in the south, variations do exist in temperature, humidity and precipitation. E.g, in summer, some parts of Rajasthan desert, in north – western India, record temperatures of 50°C, while it may be around 20°C in Pahalgam in J&K, in the north of country. On a winter night, the temperature at Drass in J&K may be as low as minus 45°C, while Thiruvananthapuram may have temperature of 22°C. In general coastal areas experience less contrasts in temperature conditions. Seasonal contrasts are more in the interior of the country.

Another case in point is precipitation, while precipitation is mostly in the form of snowfall in the upper parts of the Himalayas, it rains over the rest of the country. The annual precipitation varies from over 400cm in Meghalaya to less than 10cm in Ladakh and Western Rajasthan. Most parts of the country receive rainfall from June to September, but some parts like the Tamil Nadu coast get most of there rain during Oct and Nov.

Q No. 4. Give the characteristics and effects of the monsoon rainfall in India.
Ans. Characteristics and effects of the monsoon rainfall in India:
   a). The duration of the monsoon is between 100-120 days from early June to mid-Sep.
   b). Around the time of its arrival, the normal rainfall increases suddenly and continues for several days. This is known as “burst” of the monsoon.
   c). The monsoon have the characteristic wet and dry spells or “breaks” in rainfall. The monsoon rains take place only for a few days at a time. They are interspersed with the rainless intervals.
   d). The rainfall is unevenly distributed across Indian landscape. Parts of the western coast and north-eastern India receive the maximum rainfall. Regions such as parts of Rajasthan, Gujarat, Leh and leeward side of the Western Ghats receive very little rainfall.

Effects:
   a). Indian agriculture is largely dependent upon the water from the monsoon rains. Late, low or excessive rains have a negative impact upon crops.
   b). Due to uneven distribution of rainfall across the country, there are some regions that are drought prone and some that are flood prone.
   c). The monsoon provides India with a distinct climatic pattern. Hence, inspite of the presence of the great regional variations, it has a unifying influence upon the country and its people.

Q No.5. What are the main characteristics of climate in Kashmir valley?
Ans. The Vale of Kashmir along with some hilly areas of Jammu experiences temperate climate. The distinctive features of climate of Kashmir are:
   i). Mild summers.
   ii). Vigorous and severe winters with snow and rain.
   iii). A muggy and oppressive weather in July and August.
   iv).The most pleasant spring.
   The month of July is the hottest month in which the temperature rises upto 35C at Srinagar whereas, the coldest month is the month of January which is locally known as period of Chille-Kalan (40 days of intense cold). The rainfall occurs from mid July to mid September and heavy rainfall occurs during the winter season.

Q No.6. Give a brief description of climate in Jammu region?
Ans. The Jammu region experiences sub-tropical type of climate. The four characteristic seasons that prevail in this region are as under:
   i). Cold weather season (Mid Nov to Mid March).
   ii). Hot weather season (Mid March to Mid June).
   iii). South-west monsoon season/Advancing monsoon season (Mid June to Mid September).
   iv). Retreating Monsoon season (Mid September to Mid November).
   The hottest month is June having mean monthly temperature of about 31.6C while as the coldest month is the month of January having average temperature of about 13C. The average rainfall received in the months of July and August is about 275mm and 250mm. During summer season the hot and dry wind called as Loo blows in the afternoon.
Q No. 7. Discuss the mechanism of monsoons?

Ans. During summer, a low-pressure area develops over interior Asia as well as over north and north-western India. At the same time, there is a high-pressure system over the southern Indian Ocean. Winds move from a high-pressure area to a low-pressure area. As a result, the low-pressure system attracts the southeast trade winds of the Southern hemisphere. On crossing the equator, these trade winds—due to Coriolis effect turn right towards the low-pressure area over the Indian subcontinent. After crossing the equator, these winds blowing in a south-westerly direction, and enter the Indian peninsula as the southwest monsoon. As these winds blow over warm oceans, they bring abundant moisture to the subcontinent. Arriving at the southern tip of Indian peninsula, the wind system breaks up into two branches—the Arabian Sea branch and the Bay of Bengal branch. The Arabian Sea branch hits the Western Ghats, while the Bay of Bengal branch flows over the Bay of Bengal and hits the Eastern Himalayas. The windward side of the Western Ghats receives much of rainfall from the Arabian Sea branch, while the regions in the leeward or rain-shadow areas do not receive much rain from these winds. The north-eastern parts of the country receive much of there rainfall from the Bay of Bengal branch. As these winds move from east to west, the moisture they carry progressively declines. As a result, rainfall decreases from east to west. The Arabian Sea branch moves towards the north-east from the south-west, and joins the Bay of Bengal branch over the northern part of the country. The duration of the monsoon is between 100-120 days. By the end of this period, the low pressure system over north and north-west India gradually weakens, and this leads to the retreat of the monsoon winds.

Q No. 8. Give an account of weather conditions and characteristics of cold season.

Ans. Beginning from the mid-November, the winter season lasts till February. The weather is usually marked by clear sky, low temperature and low humidity, and feeble and variable winds. The temperature decreases from the south to the north, with the peninsular region not showing any noticeable seasonal change in temperature pattern due to the moderating influence of the sea. The coldest months are December and January. The days are generally warm and the nights are cold. Frost is common in the north and the higher slopes of the Himalayas experience snowfall. During this season, the sub-tropical westerly jet streams blowing south of the Himalayas bring in cyclonic disturbances from the Mediterranean region. These cause winter rains over the plains and snowfall in the mountains. The Tamil Nadu coast receives winter rainfall due to the blowing of the north-east trade from sea to land.

Subject English:

Q1. Why did Sheikh Noor-ud-Din Wali enter the cave?
Ans. Shaikhul-Aalam preferred to live a life of isolation right from his childhood. He was not attracted by the pleasures of material world. Even after his marriage, when he had his own children, he was not attracted by the family life. He was very pious and lived a very simple life in isolation. To be isolated from the worldly affairs, he decided to enter the cave to purify himself spiritually through meditation and by doing penance.

Q2. What does Sheikh-ul-Aalam mean?
Ans. By the word ‘sheikh-ul-Aalam’ we mean ‘spiritual guide of the world’ or ‘a saint of worldly stature’.

Q3. What kind of life did Sheikh-ul-Aalalm lead?
Ans. He led a very simple, monastic and saintly life. His commitment to the principles of truth, justice and love reveals that he led a life of truthfulness and simplicity. He dedicated his whole life to the service of mankind and proved to be a true saint.

Q4. What did Sheikh-ul-Aalam teach the people?
Ans. He taught the people the true word of God. He preached the basic principles of Islam based on truth, justice, love and honesty. As a missionary, he taught that, “A true saint is the one who fulfils the duties of life with honesty, truthfulness and humility and does not escape from
worldly duties”. In one of the verses from his book, he says that the chosen servants of God are those who worship him sincerely and fulfill their duties in life regularly.

He was not only the man of thoughts but also the man of actions. His life story is a practical example of his teachings which is sure to guide us and show us the real path.

Q5. What made people flock to Sheikh?
Ans. Sheikh’s thoughts and pious life deeply impressed the people around him. He dedicated himself to the service of mankind. Hespread the true message of God among the people and preached the basic fundamentals of Islam. The people from every nook and corner of the Kashmir Valley began to flock around him to seek spiritual guidance from this great saint.

Central Idea: - The poem is about the violence done against the trees, which are symbolic of life and beauty. The poet tries to show how the human beings are brutally butchering the flora, displaying the destructive nature of humans. The poem also shows that Mother Nature is inevitable and cannot be easily destroyed. The tree may also symbolize humanity, truth or evil, all of which have strong roots and are difficult to eliminate entirely.

Summary:- The poem ‘On Killing A Tree’ has been penned down by ‘Gieve Patel’. This is a sarcastic poem in which the poet uses various criticisms against killing a tree. The poet says that a tree takes a long time to be uprooted because it has utilized various resources from earth like water, nutrients and has grown up into a well built tree which cannot be uprooted with a simple blow of a knife. It has consumed earthly resources to sprout leaves from its cracked bark. So in order to kill a tree, a lot of effort is needed. By heavy blows, the plant can be felled but the injured bark can heal and give rise to small branches which can grow to the former size, if neglected.

In the next stanza, the poet uses the sarcasm that it is impossible to uproot a plant completely with less effort. He says that to eradicate the plant from its native place, the root which is set deep in the earth, holding it very fast, is to be chopped out. Then after digging deep, one can find the lively and active part of the tree which is very sensitive and remains preserved in the deep layers of earth. Then, finally, the tree is to be browned and hardened in sun to cause its withering otherwise it can develop roots and grow again. The poet depicts the fact that the truth takes a lot of time to be established and it is almost impossible to remove it from the earth otherwise, the existence on earth will cease to continue.

Q#1 Growth of a tree is a long process; Killing of a tree is a longer process. Do you agree?
Ans. Growth of a tree is long process but the killing of a tree is a longer process. We certainly agree with it because in the course of time, the tree uses up all the resources of earth to grow into a stout, well built tree which is very difficult to be uprooted completely.

Q#2 How has the tree grown to its full size? List the words suggestive of its life and activity.
Ans. The tree has grown to its full size by using resources of earth, absorbing water from it, developing various branches and leaves after consuming various nutrients.

The words which suggest its life and activity are:-

i) ‘Bleeding bark’:- It indicates that the plant is active and will heal quickly and then continue further growth.

ii) The resource i.e. main part of root which mainly causes growth is ‘white and wet’ indicating that the tree is very active.

iii) If the tree is left unchecked after being uprooted, it can develop ‘miniature boughs’ which can grow to former size.

Q#3 What does the poet mean by the bleeding barks? What makes it bleed?
Ans. When the trees are hacked and chopped, they ooze out a liquid which the poet compares to blood. Thus he refers to the injured part of the tree as ‘bleeding bark’.

Q#4 The poet says ‘No’ in the beginning of the third stanza. What does it signify?
Ans. ‘No’ in the third stanza is used as a criticism or a sarcastic expression. The poet says that even if we use great effort to destroy a plant but still it is impossible to eliminate it completely.
Q#5 What does the poet mean by the earth cave?
Ans. The ‘earth cave’ means the deep layers of earth in which the tree anchors its roots. Since, the root is fixed very deep that is why earth is compared to a cave which is known for its depth and provides shelter to the roots.

Q#6 What according to the poet can kill a tree?
Ans. According to the poet, a tree can be completely killed only if it is totally uprooted from the deep layers of the earth and then is left in the sun and air to dry. It hardens, browns, twists and finally withers to death.

Learning About The Literary Devices:-
Beginning with the title, what are words and images that are suggestive of violence in the poem?
Ans. The words which suggest violence in the poem are:
i) Jab of the knife.  ii) Hack  iii) Chop
iv) Snapped  v) Browning  vi) Hardening
vii) Twisting  viii) Withering
The images that are suggestive of violence in the poem:
i. A single jab or knife.
ii. The root is to be pulled out.
iii. It is to be roped, tied and pulled out- snapped out and pulled out entirely.
iv. The bleeding bark.

Qno#1 What was the cause of Johnsy’s illness? How could the illness be treated?
viii) Ans: Johnsy had contracted pneumonia, but her illness was more psychological than physical. She had lost the zest and spark of life. She was depressed and was certain that she was going to die. Even doctor suggested that no medicine could help her, till she regained her desire for life.
ix) 
x) Qno#2 Do you think the feeling of depression Johnsy has, is common among teenagers?
xi) Ans: Teenage is the period of day dreams, adventures, intense affections and stirring of the heart. It is a period of great stress and strain, storm and strife. Many mental, emotional, physical and serial changes are taking place during the stage in the teenagers. Because of the stubborn temper, the things get fixed in their mind. Therefore, it is important that teenagers should always think positively. Johnsy is also a teenager, the idea of death sticks to her mind and she can not get rid of it easily. Her friend, Sue tries to make her outlook positive.
xii) 
xiii) Qno#3 What was Behrman’s dream? Did it come true?
xiv) Ans: Behrman’s life-long dream was to paint a masterpiece. This dream came true but it cost him his life. He painted an ivy leaf ‘The last leaf’ on the wall. He worked out in the windy cold night where he caught Pneumonia and died. His painting proved a masterpiece. Even Johnsy, who was herself an artist couldn’t feel that it was not a real leaf.
xv) 
xvi) Qno#4 How is ‘The Last Leaf’ the artist’s masterpiece? What makes you say so?
xvii) Ans: Behrman’s ‘The Last Leaf’ proves to be a masterpiece because it saves the life of a budding artist. Even she can’t know that it is an artificial leaf. The presence of leaf boosts her with new enthusiasm of life.

Q#1 Why had Rustomji’s smuggling offences not been discovered earlier?
Ans. Rustomji’s smuggling offences had not been discovered earlier because he was on best terms with the custom officials; thus, nobody was inclined to suspect him. They used to consider his invoices on trust. Some of them might have even connived at his smuggling.

Q#2 What did Rustomji consider to be the greatest cause for shame to him?
Ans. Rustomji considered the discovery of his guilt to be his destruction. Going to jail was the greatest cause for shame to him.
Q#3 What did Gandhiji consider to be a greater cause for shame?
Ans. According to Gandhiji, the greater cause for shame was in committing the offence.

Q#4 Which words that Rustomji use to describe his offence show us that he did not consider it to be a moral offence?
Ans. Rustomji called his smuggling activities merely ‘tricks of trade’. These words show that he did not consider smuggling to be a moral offence.

Q#5 Who, according to Gandhiji, was the one who would finally decide whether Rustomji was to be saved or not?
Ans. According to Gandhiji, it was the Custom Officer who was to decide whether Rustomji was to be saved or not and the Custom Officer would in turn be guided by the Attorney General.

Q#6 Gandhiji and the other counsel differed in the way in which they thought the case ought to be handled. How did a Gandhiji and
b) The other counsel hope to settle the case?
Ans. Gandhiji thought that the case shouldn’t be taken to court. It should be kept upto the custom officer to prosecute Rustomji or let him free. The other counsel hoped that the case would be tried by a jury and a Natal jury would acquit Rustomji which seemed quite difficult.

Q#7 Gandhiji spoke of two penances. 
a) What were they?
b) Which of them did Rustomji not have to do?
Ans. Gandhiji spoke of two penances. The first penance was to pay penalty for the crime. The second penalty was the imprisonment. But according to Gandhiji, the real penance was to resolve never to smuggle again.
b) Rustomji did not have to be imprisoned because it would ruin his edifice of name and fame.

Q#8 Why did Gandhiji have to go to the Attorney General as well as to the custom officer?
Ans. Gandhiji had to go to Attorney General as well as Custom Officer because both of them were employed in taxation process. Moreover, the Custom Officer was guided by the Attorney General. So, after persuading the custom officer, he had to motivate the Attorney General regarding the guilt.

Q#9 Which two qualities of Gandhiji helped him to persuade the Attorney General not to drag Rustomji into court?
Ans. Gandhiji’s persuasiveness and frankness helped him to persuade the Attorney General not to drag Rustomji into court.

Q#10 What did Rustomji (a) lose (b) partly save by the settlement of the case.
Ans. Rustomji lost twice the amount of money which he had earned by smuggling. Rustomji partly saved his edifice of name and fame by the settlement of the case.

Subject: Science

SOUND

SOUND: Sound is a form of energy which produces a sensation of hearing in our ears. Sound is produced when objects vibrate. We hear sounds from various sources like humans, birds, machines; televisions etc. sound travels in the form of waves.

PROPAGATION OF SOUND: Sound is produced by vibrating objects. The matter or substance through which sound is transmitted is called medium. It can be solid, liquid or a gas. When an object vibrates, it sets the particles of the medium around it vibrating. As a result, the adjacent particle gets displaced from its position. A series of compression and rarefaction is set up in the air and sound is propagated through the air. When these compression and rarefaction reaches the ear drum vibrates and we hear the sound.

Wave: A wave is a vibratory disturbance in a medium which carries energy from one point to another. When a wave passes through a medium, the medium itself does not move along the direction of the wave, only the particles of the medium vibrate about their positions. There are two types of waves namely; longitudinal waves and transverse waves.
NATURE OF SOUND: Sound travels in the form of waves. Sound waves are longitudinal waves.

LONGITUDINAL WAVES: A wave in which the particles of the medium vibrate back and forth in the same direction in which the wave is moving called a longitudinal wave. The direction of vibration of the particles is parallel to the direction of wave. Longitudinal waves can be produced in solids, liquids and gases. The waves produced by compressing a spring are an example of longitudinal wave. A longitudinal wave travels through a medium forming compressions and rarefactions. A compression is a region of the medium in which particles are compressed i.e. particles come closer. A rarefaction is a region of the medium in which particles are rarefied i.e. particles get farther apart than their normal distance. In fig. compression is indicated by C and rarefaction by R.

TRANSVERSE WAVE: A wave in which particles of the medium vibrate about their mean position in a direction perpendicular to the direction of the propagation of wave is called transverse wave. These waves propagate in solids and liquids. The waves set up in water by dropping a stone are examples of transverse waves. A transverse wave passes through a medium forming crests and troughs. A crest is a portion of the medium, which is raised temporarily above the normal position of rest of the particles of medium. A trough is a portion of the medium, which is depressed temporarily below the normal position of rest of the particles of the medium.

SOUND NEEDS A MEDIUM TO TRAVEL: Sound wave needs a medium like, air, water etc. for its propagation. It cannot travel through vacuum, which can be demonstrated by the following experiment.

EXPERIMENT: Take an electric bell and an air tight jar. The electric bell is suspended inside the air tight bell jar. The bell jar is connected to a vacuum pump, as shown fig. if we press the switch on we will hear the bell. Now start the vacuum pump. When air in the jar is pumped out gradually, the sound becomes fainter, although the same current is passing through the bell. As more and more air is taken out from the jar, sound becomes fainter and fainter. When all the air has been removed from the bell jar, i.e. a vacuum has been created in the bell jar, no sound can be heard at all (though we can see the hammer striking the bell). It is clear from this experiment that sound waves cannot travel through vacuum. A medium is necessary to carry sound waves.

CHARACTERISTICS OF A SOUND WAVE: A sound wave can be described completely by five characteristics: Wavelength, Amplitude, Time-period, Frequency and Velocity. Consider a longitudinal sound wave by the vibrations of a tuning fork.

WAVELENGTH: In a sound wave, the distance between the centers of two consecutive compressions or two consecutive rarefactions is called its wavelength. The S.I unit of measuring wavelength is meter. Wavelength is denoted by a Greek letter \( \lambda \) (lambda).

AMPLITUDE: The maximum displacement of the particles of the medium from their original undisturbed positions, when a wave passes through the medium, is called amplitude of the wave. Amplitude is used to describe the size of wave.

TIME-PERIOD: The time required to produce one complete wave is called time-period of the wave. It can also be defined as time taken to complete one vibration. Time-period is measured in seconds.

FREQUENCY: The number of complete waves produced in one second is called frequency of the wave. If 10 complete waves are produced in one second, then the frequency of the waves will be 10 hertz. The S.I unit of frequency is hertz written as Hz. 1 hertz is equal to 1 vibration per second. 1 kHz = 1000Hz. The frequency of a wave is denoted by \( f \). Some times frequency is denoted Greek letter \( \nu \) (nu).

The frequency of a wave is the reciprocal of its time-period.

\[
\text{Frequency} = \frac{1}{\text{Time-period}} \quad \text{or} \quad f = \frac{1}{t}
\]

VELOCITY: The distance traveled by a wave in one second is called velocity of the wave. The S.I unit of velocity of wave is meter per second.
RELATION BETWEEN VELOCITY, FREQUENCY AND WAVELENGTH OF A WAVE

Suppose a wave travels a distance lambda (\( \lambda \)) which is its wavelength in time \( t \) then velocity of wave is distance divided by time i.e., \( v = \text{distance/time} \)

Or, \( v = \frac{\lambda}{t} \)

\[ v = \lambda \cdot \frac{1}{t} \]

In other words, velocity of a wave = wavelength \times frequency

This is known as wave equation.

CHARACTERISTICS OF SOUND: A sound has three characteristics: loudness, pitch and quality (or timbre)

LOUDNESS: The loudness of sound is a measure of the sound energy reaching the ear per second. The loudness of sound depends on the amplitude of sound waves. If the sound waves have small amplitude, then the sound will be faint or soft. On the other hand, if the amplitude is large then sound will be loud. When a table is stroked lightly, less energy is supplied, table vibrates with small amplitude and a soft sound is produced. When table is stroked hardly, greater energy is supplied; table vibrates with large amplitude and hence produces a loud sound. Loudness is measured in (decibel) written as dB. The softest sound is zero dB.

PITCH: Pitch is that characteristics of sound by which we can distinguish between different sound of same loudness. The pitch of a sound depends on the frequency of vibration. Sounds of low frequency have low pitch and sounds of high frequency have high pitch. A man’s voice and a woman’s voice differ in pitch. A man’s voice is flat having low pitch, whereas a woman’s voice is shrill having a high pitch.

QUALITY OR TIMBRE: It is that characteristic of musical sound which enables us to distinguish between the sounds of same pitch and loudness produced by different musical instruments. This characteristic depends on the shape of sound wave. The sounds produced by different musical instruments like violin, piano, sitar, etc. can be distinguished by their quality. The singing sound of singers such as Lata Mangeshkar, Nusrat Feteh Ali Khan, Daler Mehndi etc can be distinguished on the basis of their quality.

SPEED OF SOUND: The speed of sound is different for different mediums. The speed of sound depends on properties of medium through which it travels. It also depends on the temperature and pressure of the medium. The speed of sound decreases as we go from solid to gaseous state. Speed increases if we increase the temperature of the medium e.g., the speed of sound in air is 331m/s at 0°C and 344m/s at 22°C. In general, sound travels slowest in gases, faster in liquids and fastest in solids. The speed of sound is 1498m/s.

INTENSITY OF SOUND: The amount of sound energy passing each second through unit area is called the intensity of sound.

SONIC BOOM: When the speed of any object exceeds the speed of sound it is said to be traveling at supersonic speed. Bullets, jet air crafts etc. travel at supersonic speeds. Due to this very high speed, a supersonic aircraft produces extremely loud sound waves called shock waves in air. These shock waves carry a large amount of energy. The air pressure variation caused by the shock waves produce a loud burst of sound called sonic boom.

REFLECTION OF SOUND: The bouncing back of sound when it strikes a hard surface is called reflection of sound. Hard, solid surfaces are best reflectors of sound. Sound is reflected well from surfaces like a wall, a metal, stones etc. soft surfaces are bad reflectors of sound. Soft surfaces absorb sound. Sound is reflected in the same way as light. The laws of reflection are obeyed during reflection of sound.

EXPERIMENT: Take two identical tubes about 50cm long and 3cm wide and a drawing board which acts as reflecting surface. Adjust the tubes on a table such that the tubes should not touch the card board. Keep a clock near the open end of one tube. The clock makes a ticking sound. The sound waves pass through the tube \( T_1 \) get reflected from the drawing board and then enter the other tube \( T_2 \). Adjust the position of the tubes so that we hear best ticking from the other end of second tube. Draw normal at the reflecting surface of drawing board. Measure the angle of incidence of sound (AON) and also measure angle of reflection (BON) . The angle of incidence will be equal to the angle of reflection. Moreover, the incident waves OA and the reflected
wave OB and normal ON lie on same plane. From this experiment we conclude that sound obeys the laws of reflection of light.

**ECHO:** The repetition of sound caused by the reflection of sound waves is called an echo. When a person shouts in a big hall, we first hear his original sound. After a little while, we hear the reflected sound of shout. This “reflected sound” is an **echo**.

**Minimum distance to hear echo:** It has been estimated by scientists that if two sounds reach our ears within an interval of $1/10$th of a second, then we cannot hear them as separate sounds. The human ear can hear two sounds separately only if there is a time interval of $1/10$th of a second or more between the two sounds. Thus an echo can be heard if there is time interval of $1/10$th = 0.1 sec between original sound and reflected sound. The speed of sound is 344m/s in air at 22°C. The distance covered by sound in 1 sec is 344m. Now for an echo, time interval is 0.1 sec so, distance covered by sound in 0.1 sec = $344 \times 0.1 = 34.4$ m. Thus, for hearing echoes, the minimum distance of the obstacle from the source of sound must be half of this distance that is, $34.4/2 = 17.2$ m. Thus at 22°C, we should be 17.2 m away from the sound reflecting surface like a wall.

**Reverberation:** The persistence of sound in a big hall due to repeated reflections from walls, ceiling and floor of the hall is called reverberation. A short reverberation is desirable in a concert hall (where music is being played) it gives life to sound and boosts sound level. But if the reverberation is too long, then the sound becomes blurred, distorted and confusing due to overlapping of different sounds. The excessive reverberation in big halls is reduced by types of sound absorbing materials. To reduce reverberation the following methods are applied:

(a) Roof and walls of the hall or auditorium are covered with sound absorbent materials like compressed fireboard, curtains, carpets etc.
(b) Carpets are put on the floor to absorb sound.
(c) Heavy curtains are put on doors and windows to absorb sound.

**Range of hearing in humans:** The sounds in our environment have different frequencies. The sounds of all frequencies cannot be heard by the human beings. The range of frequency from 20 hertz to 20000 Hz is known as the frequency range of hearing in humans. The sound which we are able to hear is called **audible range.** The audible range of sound frequencies for human ear is from 20 hertz to 20000 hertz. Thus human ear can’t hear sounds which have frequency less than 20 hertz or greater than 20000 hertz.

**Infrasonic sounds:** The sounds of frequencies lower than 20 hertz are known as **infrasonic sounds.** These are low frequency sounds. Infrasonic sounds are produced by those objects which vibrate very slowly. For example, a vibrating simple pendulum produces infrasonic sounds which we cannot hear. Earthquakes and some animals like whales, elephants and rhinoceroses also produce infrasonic sounds. It is observed that some birds and animals start running here and there just before the earthquake occurs. This is because, before main shock waves, the earthquake produces low-frequency infrasonic sounds which some animals can and get disturbed.

**Ultrasonic sounds:** The sounds of frequencies higher than 20000 hertz are known as **ultrasonic sounds.** These are high frequency sounds. Ultrasonic sounds cannot be heard by human beings. Dogs can hear sounds of frequency up to 50000 hertz. Monkeys, deer, cats, dolphins can hear ultrasonic sounds. Bats can hear sounds having frequencies up to 120000 hertz. Bats can also produce ultrasonic sounds while screaming. We cannot hear screaming of a bat because its screams have frequency much higher than 20000 hertz which is beyond our limit of hearing. Children under the age of 5 years can hear ultrasonic sounds of frequency up to 25000 hertz.

**Applications of ultrasound:** The ultrasound is reflected just like ordinary sound waves and produces echoes. Due to its very high frequency, ultrasound has a much greater penetrating power than ordinary sound. It is therefore used to detect objects under sea and organs inside human body. Some of the uses of ultrasound are described as:

1. Ultrasound can be used to detect cracks or flaws in metal blocks. Metallic blocks are used in construction of big structures like buildings, bridges etc. The cracks or holes inside the metal blocks which are invisible from outside reduce the strength of the structure. Ultrasonic waves are allowed to pass through the metal block and detectors are used to detect the transmitted waves. If the ultrasound waves pass through the block uninterrupted, then the metal block is flawless or defect free. If, however, ultrasound waves are not
able to pass through a part of the metal block and gets reflected back, then there is a flaw or defect in the block like a crack or a hole.

(2) Ultrasound may be used to break stones formed in the kidneys into fine grains. These grains later pass out with urine.

(3) Ultrasound scanner is used to monitor the development of fetus (unborn baby) during pregnancy and scanning of organs like liver, gall bladder, kidney and heart. Ultrasound waves travel through the tissues of the body and get reflected from a region where there is any change in the density of tissues. These waves are converted into electrical signals that are used to generate images of the organ. These images are then displayed on a monitor or printed on a film. This technique is called ultrasonography. Ultrasonography is used for the examination of fetus during pregnancy to detect any growth abnormalities. The use of ultrasound waves to investigate the action of heart is called echocardiography.

(4) Ultrasound is used to clean “hard to reach” parts of objects such as spiral tubes, odd shaped machines etc. the object to be cleaned is placed in a cleaning solution and ultrasound waves are passed into the solution. Due to their high frequency, the ultrasound waves stir up the cleaning solution. The particles of dust and grease sticking to the dirty object vibrate too much, become loose get detached from the object and fall into the solution. In this way the object gets cleaned thoroughly.

SONAR: The word “SONAR” stands for “Sound Navigation And Ranging.” Sonar is an apparatus which is used to find the depth of a sea or to locate the underwater things like shoals of fish, ships, and enemy submarines.

WOKING: Sonar consists of two parts: (a) Transmitter (b) Receiver
Sonar is attached to the under-side of a ship. The transmitter emits an ultrasonic wave with a high frequency of about 50000 hertz. This ultrasound wave travels down the sea –water and after striking the object on the sea bed, gets reflected back in the form of an echo. This echo produces an electrical signal in the receiver part of the sonar. The distance of the object that reflected the sound wave can be calculated by knowing the speed of sound in water and the time interval between transmission and reception of ultrasound. The sonar gives the measure of the time taken by the echo to return to the ship. Half of this time is the actual time taken by ultrasound from the ship to the object. Let the time interval between transmission and reception of ultrasound signal be T and the speed of sound in sea water be V. If the distance is d then total distance will be 2d then, 2d = V X T. This method is called echo-ranging. The sonar is used to determine the depth of the sea and to locate under water hills, valleys, submarine, icebergs etc.

BATS USE ULTRASOUND: Bats emit high-frequency ultrasonic squeaks while flying and listen to the echoes produced by the reflection of their squeaks from the prey like a flying insect. From the time taken by the echo to be heard, bats can judge the distance of the prey and hence catch it. The nature of reflections tells the bat whether the obstacle is prey or something else.

THE HUMAN EAR: The ears are the sense organs which help us in hearing sound. The ear consists of three compartments: outer ear, middle ear and inner ear. The part of ear which we see outside the head is called outer ear. The outer ear consists of a broad part called pinna and about 2 cm to 3 cm long passage called ear canal. At the end of ear canal is a thin, elastic and circular membrane called ear-drum or tympanum. Middle ear contains three small bones called hammer, anvil and stirrup. The inner ear has a coiled tube called cochlea. One end of cochlea is connected to the middle ear and the other to auditory nerve which goes into the brain.

WORKING OF HUMAN EAR: The sound from the surroundings is collected by the pinna of outer ear. These sound waves pass through ear canal and fall on the ear drum. When the compression of sound wave strikes the ear – drum, the pressure on the outside of ear drum increases and pushes it inwards. When rarefactions fall on ear drum, the pressure on outside of ear drum decreases and it moves outwards. Thus ear drum starts vibrating back and forth. The vibrating ear drum causes small bone hammer to vibrate. Vibrations are passed to second bone anvil and finally to the third bone stirrup. The function of three bones is to amplify (make stronger) the vibrations of ear drum. The vibrations are passed to a liquid in the cochlea. The vibrating liquid of cochlea sets up electrical signals in the nerve cells and sends these signals to the brain. The brain interprets these signals as sound and we get the sensation of hearing.

Thomson’s Model of an Atom:: In order to overcome the drawbacks of Dalton’s atomic theory i.e. atom is indivisible and indestructible, Thomson proposed his model of atom. The main postulates of his model are:
1. An atom consists of a positively charged sphere and electrons are embedded in that sphere.
2. The positive and negative charges are equal in magnitude but opposite in sign such that an atom is electrically neutral.

When Thomson proposed his model, neutrons were not discovered. This model was similar to Plum-pudding or a water melon.

- **Rutherford’s Model of the Atom:** Ernest Rutherford wanted to know the distribution of electrons within an atom. For the same purpose, he performed an experiment known as “Rutherford’s scattering experiment”. In this experiment, he bombarded a thin gold foil with alpha ($\alpha$) particles. He carried out his experiment as:
  1. He took a thin sheet of gold about 1000 atoms thick.
  2. He bombarded the gold foil with narrow beam of $\alpha$-particles. $\alpha$ - Particles are doubly charged helium ions which have a mass of 4u.
  3. It was expected that majority of $\alpha$-particles would be deflected by the atoms of gold foil but the results were totally different from the expected ones,

![Diagram](image)

**Observations:**
1. Most of the $\alpha$-particles passed straight through the gold foil.
2. Some of the $\alpha$-particles were deflected through small angles.
3. Very few i.e. 1/12000 $\alpha$-particles retraced their path.

**Conclusions:** From the $\alpha$-particle scattering experiment Rutherford concluded that:
1. Most of the space inside the atom is empty because most of the $\alpha$-particles passed straight through the gold foil without getting deflected.
2. A nucleus is present at the centre of an atom which is positively charged because few of the $\alpha$-particles were deflected or rebounded back.
3. The size of nucleus is very small as compared to the total volume of atom because very few $\alpha$-particles were deflected.
4. Whole mass of atom (atomic mass) is concentrated in the nucleus.

On the basis of his experiment, Rutherford put forward his model of atom which stated that:
1. There is a positively charged centre in an atom called the nucleus. Nearly whole mass of atom is concentrated in the centre.
2. The electrons revolve around the nucleus in well-defined orbits.
3. The size of the nucleus is very small as compared to the size of the atom.

**Drawbacks of Rutherford’s model of the atom:**
1. According to Maxwell’s electromagnetic theory, charged particles when accelerated should emit electromagnetic radiations. Thus, the revolving electron should lose energy in the form of electromagnetic radiations and ultimately fall on the nucleus which means collapsing of atom. But the collapse doesn’t occur in reality. Rutherford couldn’t explain this fact.
2. The nucleus in fixed orbits. However, he didn’t specify the no. of orbits and no of electrons in each orbit.
**Bohr’s Model of Atom:**
In order to overcome the drawbacks of Rutherford’s model of the atom, Neil Bohr put forward a new model of atom in 1913. Its main postulates are:

1. An electron in an atom revolves around the nucleus only in definite circular orbits. These orbits are associated with definite amounts of energies and are called energy shells or levels. These are numbered as 1, 2, 3, 4,…… and designated as K, L, M, N…….
2. As long as electron remains in a particular orbit, it neither gains nor loses energy. These orbits are therefore called stationary states.
3. The angular momentum of an electron revolving around the nucleus is fixed (quantized) and is equal to
   \[ \frac{h m v r}{2\pi} \]
   Where \( m \) = mass of electron, \( v \) = velocity of electron,
   \( r \) = radius of orbit, \( h \) = Plank’s constant and \( h = 6.626 \times 10^{-34} \)
4. Energy is absorbed or emitted only when the electron jumps from one orbit to another i.e. from ground state to excited state. The energy emitted or absorbed is given by
   \[ \Delta E = E_2 - E_1 = HV \]
   \[ V = \frac{E_2 - E_1}{h} \]  
   Equation for frequency of emitted radiation.
   Where \( \Delta E \) = Change in energy
   \( E_2 \) = Level having higher energy, \( E_1 \) = Level having lower energy.

**Advantages of Bohr’s model of the atom:**
1. It explains the stability of an atom.
2. It explains the phenomenon of atomic structure in case of H-atom.
3. It helps in calculating radius of the orbit in which electron revolves.

**Drawbacks of Bohr’s Model of the atom:-**
1. Bohr’s model couldn’t explain the spectrum of atoms having more than one electron.
2. Bohr’s model couldn’t explain Zeeman and Stark effect.
3. Bohr treated electron as a particle. He was unaware of the wave nature of electron.

**Distribution of electrons in different shells/orbits:-**
The distribution of electrons into different orbits of an atom was suggested simultaneously but independently by Bohr and Bury. This scheme is, therefore, known as Bohr-Bury Scheme. According to this scheme,
1. The max no of electrons present in a shell is given by the formula \( 2n^2 \) where \( n \) = no of energy shell 1, 2, 3,….. hence the max no of electrons present in a shell is as:
   - For K-Shell = \( 2 \times 1^2 = 2 \)
   - For L-Shell = \( 2 \times 2^2 = 8 \)
   - For M-Shell = \( 2 \times 3^2 = 18 \)
   - For N-Shell = \( 2 \times 4^2 = 32 \) and soon.
2. The max no of electrons that can be accommodated in the outermost orbit is 8, even though it may have capacity to hold more electrons. It is done just to have an orbit. For example
   - Ca (\( z = 20 \)) configuration = 2, 8, 8, 2
3. Electrons are not accommodated in a given shell, unless the inner shells are filled. Atomic structure of first 18 elements is given
Isotopes:- Atoms of an element having the same atomic no but different mass numbers are known as isotopes of that element. For example:

i) $^{12}\text{C}$ and $^{14}\text{C}$

ii) $^{35}\text{Cl}$ and $^{37}\text{Cl}$

iii) $^{1}\text{H}^1$, $^{2}\text{H}$ or D, $^{3}\text{H}$ or T

Protium Deuterium Tritium

Chlorine occurs in two isotopic forms in nature, with masses 35u and 37u in the ratio of 3:1

The average atomic mass of Cl-atom is:

$$\frac{35 \times 75}{100} + \frac{37 \times 25}{100} = 35.5u$$

Uses / Applications of Isotopes:-

Some important uses of isotopes are:

1. An isotope of uranium (U – 235) is used as fuel in nuclear reactors to produce energy.
2. An isotope of carbon (C-14) is used to determine the age of old and dead objects.
3. An isotope of cobalt is used in the treatment of cancer.
4. An isotope of iodine is used in the treatment of goiter.

Types of Isotopes:

i) Radioactive isotopes:- These isotopes are unstable and spontaneously breakdown and give out α(alpha), β(Beta), γ(Gamma) rays.

ii) Non-radioactive isotopes:- These isotopes are stable:- Eg; $^{1}\text{H}^1$, $^{2}\text{H}$ and $^{11}\text{Na}^{23}$.

Isobars:- Atoms of different elements having same atomic mass but different atomic no’s are called isobars. The isobars show different physical and chemical properties, Eg; $^{18}\text{Ar}^{40}$ and $^{20}\text{Ca}^{40}$

Discovery of Protons:- It was Goldstein (1886) who for the first time proved experimentally the presence of protons in an atom. He repeated the experiment of the discharge tube using porous cathode. On applying a high voltage under low pressure, he observed a faint red glow on the wall behind cathode. Since, these rays originated from anode, they are called anode rays or canal rays.

Discovery of Neutron:- Neutrons were discovered by James Chadwick (1932):- Neutrons have no charge and mass nearly equal to that of one proton. A neutron is represented as ‘n’. The mass of an atom is therefore given by the sum of the masses of protons and neutrons present in the nucleus. Neutrons are present in the nucleus of an atom.

=> Charge on the electron:

The change on electron = $1.6 \times 10^{-19}$ coulomb

Value of e/m for electron [e/m = charge to mass ratio]

$$e/m = 1.76 \times 10^{11} \text{C/kg}$$

Mass of electron = 1/1840 amu.

Similarly, charge of proton = $1.6 \times 10^{-19}$ C

$$e/m = 9.58 \times 10^{4} \text{coulomb/g}$$

Mass of proton = $1.67 \times 10^{-24}$ g.

Textual Questions

Q If K and L shells of an atom are full, then what would be the total np’ of electrons in the atom?

Ans.If K and L shells of an atom are full, it means { K L M N } 2, 8

and no.’ of electrons = 10.
Q Compare the properties of electrons, protons and neutrons.

<table>
<thead>
<tr>
<th>Property</th>
<th>Electron</th>
<th>Proton</th>
<th>Neutron</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Symbol</td>
<td>e or ( \text{e}^- )</td>
<td>P or ( \text{H}^+ )</td>
<td>N or ( \text{n}^0 )</td>
</tr>
<tr>
<td>2. Relative charge</td>
<td>-1</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>3. Rel. mass in a.m.u.</td>
<td>1/1837</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5. Position within atom</td>
<td>Outside the nucleus.</td>
<td>Inside the nucleus.</td>
<td>Inside nucleus.</td>
</tr>
</tbody>
</table>

Q What are the limitations of Thomson’s Model of Atom?

Ans. The limitations of Thomson’s model of atom are:
1. He considered atom to be a sphere such that electrons are embedded in it.
2. He was unaware of the fact that electron revolves around the nucleus in orbital.
3. He was unaware of the presence of neutrons in the nucleus of atom.
4. He was unaware about the position of nucleus in the atom.

Q Na+ means that sodium has lost one electron and acquired a +ve charge.

Ans. In natural state, sodium shows an electronic configuration of Na(Z = 11) K L M N
2, 8, 1
But for Na+, it is like: K L M N
2, 8, 0
It indicates that sodium is quite stable as Na+ because K and L shells are completely filled and the one electron which was (present in M shell) that was making it unstable is lost by Na to achieve stable configuration.

Q If Br- atom is available in the form of two isotopes \( ^{35}\text{Br}^{79} \) (49.7%) and \( ^{35}\text{Br}^{81} \) (50.3%). Calculate the average, atomic mass of bromine atom.

Ans. For \( ^{35}\text{Br}^{79} \) % age = 49.7% = 50%
And for \( ^{35}\text{Br}^{81} \) % age = 50.3% = 50%
\( \therefore \) Average atomic mass = \( 79 \times 50/100 + 81 \times 50/100 = 79/2 + 81 = 160/2 = 80u \)

Q The average atomic mass of a sample of an element x is 16.24. What are the % age of isotopes 16x8 and 18x in the sample?

Ans. Atomic mass = 16.2u (Given)
\( \therefore \) 16.2 \( x \times 16 + 18 \times (100 – x) \)
\[ \text{--------} = \text{------------------------} \]
\[ 10 \quad 100 \]
\( \Rightarrow 1620 = 16x + 1800 – 18x \) (By C.M)
1620 – 1800 = 16x – 18x
- 180 = - 2x
\( x = 180/2 = 9 \% \)
\( \therefore ^{16}\text{x}^{16} \) is 90% and \( ^{18}\text{x}^{18} \) is 10% (100 – x = 10%)

Q#1 What is health? State any two conditions essential, for good health.

Ans. Ecologist viewed “health as a dynamic equilibrium between internal environment & external environment”

According to (WHO) world health organization defines “health as a state of complete physical, mental & social well-being & not merely an absence of disease.
The two conditions which are essential for good health are as under:-

a) **Proper Nutrition:** - For keeping & maintaining good health a person should take balanced diet.

b) **Personal hygiene:** -
Q#2 Symptoms of good health
Ans. The symptoms of good health are as under:
   a) **Good Physical health:** Means perfect functioning of the body signs of physical health are good
      complexion, clear skin, bright eyes, lustrous hair, not too fat, a good appetite, sound sleep.
   b) **Mental Health:** Means a person should be free from anxiety & stress.
   c) **Social Well Being:** Implies harmony & integration within the individual & society.

Q#3 What is disease? Define types of disease.
Ans. The term disease has come from two words ‘des’ means away & ‘Aise’ means ‘ease’. Disease means uncomfortable or uneasy.
   “Disease is a condition in which body health is impaired”.
   Disease is a condition of the body or some part or organ of the body in which its functions are disrupted”.
   The human diseases are categorized into two types:
   1) **Congenital disease:** These diseases are present in an individual from birth due to genetic abnormality.
   2) **Acquired disease:** These develop after birth & can be classified into:
      a) **Communicable diseases:** These diseases are caused due to specific infectious agents or its toxic products capable of being directly or indirectly transmitted from man to man or from the environment (air, dust, soil etc.) to man.
      i) **Deficiency diseases:** These are caused due to deficiency of certain nutrients in our diet e.g. proteins, minerals. Examples, Marasmus, Goitre, Beri – Beri etc.
      ii) **Degenerative disease:** These are caused due to malfunctioning of body organs or degeneration of tissues e.g. Cancer, Kidney failure.

Q#4 What are acute & chronic disease?
Ans. a) **Acute Diseases:** The diseases which last for very short periods of time are called acute disease e.g. common cold, dysentery.
b) **Chronic disease:** The diseases that last for a long time even as much as life time e.g. Cancer etc.

Q#5 What is a balanced diet?
Ans. A balanced diet is one which contains a variety of foods (proteins, fats & carbohydrates) in such quantities & proportions so that the need for energy, amino acids, vitamins, minerals, water & roughage is adequately met for maintaining health. The ratio should be in the ratio of (H: 1:1).

Q#6 What is difference between signs & symptoms?
Ans. Symptoms of diseases are the changes that can be presented by the patient to the doctor. E.g; headache,
   Signs are the basis for the conformation of any disease from symptoms.

Q#7 What are various modes of transmission?
Ans. An infectious disease is transmitted by only one routes enhance the survival of infections agent. The modes of transmission of infectious disease are as follows:
   1) **Direct Transmission:**
      i) By direct contact: Diseases like leprosy, skin & eye infection are transmitted by direct contact.
      ii) By droplets: Disease like respiratory infections transmitted by droplets i.e. coughing, sneezing or speaking & spitting etc.
      iii) By contact with soil.
      iv) Through placental transmission.
      v) Through placental transmission.
   2) **Indirect Transmission:**
Illness: Is a subjective state of the person who feels that he is not well.

AIDS (Acquired Immune deficiency Syndrome)
It is also called as “Slim disease”. It is caused by RNA virus called as HIV (human immuno deficiency virus). It breaks down the immune system of the body. The victim becomes vulnerable to a host life- threatening infections.

It is a protein capsule containing two short stands of genetic material (RNA). It perpetuates in human cell & has ability to destroy human T₄ or helper cell. It spreads throughout the body. It can pass through the blood- brain barrier & destroy brain cells causing neurological & psycho motor abnormalities.

Source of Infection: - Blood & Semen are the main source.

Symptoms:- AIDS patient shows signs of unexplained diarrhea lasting more than one moth. Fatigue, loss of body weight, blood platelets count decrease that cause hemorrhage & fever.

Transmission:- 1) It is a sexually transmitted disease. 
2) AIDS is also transmitted by blood transfusion by blood transmitted. 
3) It is also transmitted through a contemned needle & syringe.

Principle of treatment
There are two methods of treatment of an infectious disease:-
1) By reducing the effects of the disease.
2) By killing the course of the disease.

Principle of prevention
Prevention of disease is better than cure. There are two ways of prevention of a disease:-

1) General way of prevention of a disease:

Preventing expose to infectious microbes.
- For airborne microbes we can provide living conditions which are not over crowded.
- For waterborne microbes avoid contamination H₂O.
- For vector borne infections public hygiene is a basic key.

2) Specific way of prevention of a disease.
Providing proper & sufficient food. By immune response.

Immunization
Immunization is the term used for introducing dead or weakened germs in the body of living beings for developing immunity or resistance against the particular disease.

Vaccination
Vaccination is a term cawed by Edward Jenwer for the process of administering live, weakened microbes into the body, for developing resistance to a particular disease.

A vaccine is a preparation used to produce active immunity to a disease in order to prevent the effects of infection by any organism.

The process of distributing a administrating vaccines is referred as vaccination & is done mostly by infection when vaccine enters the body, it stimulate, WBC’s in the body to produce antibodies against the disease –causing germs.

Q Define the following terms:-

1) Pathogens: - are the agents which are responsible for the spread of various disease e.g. viruses, bacteria, fungi etc.

2) Droplet infection:- Droplets are airborne. The infected person thrown out tiny droplets O mucus by coughing, sneezing splitting, or even talking.

3) Xerophthalmia: - It is caused due to the deficiency of vitamin A (Retinol).

4) PEM (Protein-energy –Malnutrients):- PEM are disease caused due to deficiency of proteins, carbohydrates & fats. E.g. Marasmus & Kwashiorkor.

5) water- Soluble Vitamins: - VitB , Vit C.

6) Fat – Soluble Vitamin:- Vit A, Vit D, VitK.
(دروازه)

درالاردو کی اس تر��مہ میں سے ایک ہے، اس کس سے کہا جاتا ہے "اسلامی اعمال کی تقریب"، یہاں کے مشہور فعلی و متعین دار اسلوبی "بلوچی" سے ملتا ہے۔ اس افادات سے وارثیہ کہا گیا، اس کا دائرہ کنیاں نہیں۔

(1) پہلا: اس کے لئے وہ لوگ جو اسلام کے دائرہ کہتے ہیں، ایک م铿ک کی واحدۂ واحدۂ نمبر کے اسلاق دیکھنے والے ہیں۔ اس ظواہر کے عالم، اسلاق کی تعلیم و تربیت، اسکول کے خصوصی عالم، اس کے لئے بہت خطاب کی ہے۔

(2) دوواں: اس کے لئے وہ لوگ جو اسلام کے دائرہ کہتے ہیں، ایک م铿ک کی واحدۂ واحدۂ نمبر کے اسلاق دیکھنے والے ہیں۔ اس ظواہر کے عالم، اسلاق کی تعلیم و تربیت، اسکول کے خصوصی عالم، اس کے لئے بہت خطاب کی ہے۔

(3) مثل: اتار کے اسلاق کی تعلیم و تربیت، اسکول کی خصوصی عالم، اس کے لئے بہت خطاب کی ہے۔

(4) چوہا: اس کے لئے وہ لوگ جو اسلام کے دائرہ کہتے ہیں، ایک م铿ک کی واحدۂ واحدۂ نمبر کے اسلاق دیکھنے والے ہیں۔ اس ظواہر کے عالم، اسلاق کی تعلیم و تربیت، اسکول کے خصوصی عالم، اس کے لئے بہت خطاب کی ہے۔

کہ کسی کہ کسی کا اسلام کا اندازہ ہے۔ اس کے لئے وہ لوگ جو اسلام کے دائرہ کہتے ہیں، ایک م铿ک کی واحدۂ واحدۂ نمبر کے اسلاق دیکھنے والے ہیں۔ اس ظواہر کے عالم، اسلاق کی تعلیم و تربیت، اسکول کے خصوصی عالم، اس کے لئے بہت خطاب کی ہے۔

(افتداغ)

افتداغ ایک انقلاب کی تقریب کا نام ہے جس کی ابتدائی اور خاتون بیوی امامان کے قریب بات میں اضافہ کرنا ہو گا افتداغ کے اندازہ تکنیک ہیں پرانت ہے، لیکن ہمارے حالات میں اضافہ کرنا ہوگا افتداغ کے اندازہ تکنیک ہیں پرانت ہے۔
بہ و غربی تہذیب نے اپنے سفر کے ساتھ سفر کے گرو گرو کے بے حال لگے تے لگئے تھے، لیکن کشمیر کے مشرق میں بھی بہاء الادباً کی اپنی عاشقی کے ساتھ ساتھ اپنی ترقی کے ساتھ ساتھ ہوئی۔

پہلے جواں جیل کے پریم چند کا پہلا فسانہ سجاد حیدر یلدر م، سجاد حیدر جوس، نیاز فتح پوری، مجنون گور ری، نہایت نے اپنے ادب کے انداز میں ترقی کی۔

پریم چند کی کہانیوں کا ادب بنگالی ادب میں عامتہ و ادب کی ترقی کے اندر فن کی ترقی ہے۔ ادب کے جلد نے اس کا ادبی انسان پرافہ کی۔

کشمیر میں ادب اور ایکڈ کے لیے بہت سخت ہے۔ جو گرو گرو میں شامل ہے۔ سجید حیدر یلدر م، سجاد حیدر جوس، نیاز فتح پوری، مجنون گور ری، نہایت نے اپنے ادب کے انداز میں ترقی کی۔

میں سے یہ تحریک میں شرکت کرنا نیز فسیلسٹ اور افسنہوں سے متاثر ہو جاتے ہیں تھے اور غربی ادب کی ترقی میں بہت ساکھا ہوا ہے۔

بہاء الادباً کی چند فسانوں کے لیے انسان ترقی نے اپنے ادب کے انداز میں ترقی کی۔

کمشیر میں انسان کی دوستی کے انداز میں انسان ترقی نے اپنے ادب کے انداز میں ترقی کی۔

بہاء الادباً کی چند فسانوں کے لیے انسان ترقی نے اپنے ادب کے انداز میں ترقی کی۔
(سکپ: ناول)

ناول ایک تہجیزی ترجمہ ہے جو سمجھنے کے لئے متعارف نہ ہے ایک لئے اس کا نام ہے۔ انسوئیت میں ناول ایک بڑا ازدواجی ہے جو اس کے اولاً اور اس کے نام جو اس کے اولاد، اس کا نام ہے۔ ایک کہ اس کا سالم ناول گنجیا کے سخت اور فذہ کے اخلاق کے لئے کافی ہے۔ اس کے خواہش کے خواہش ہے۔ اس کے دروازہ ایک بڑا جنگرپ زے ہے۔ اگرچہ ایک ناول کا کہا جاتا ہے کہ یہ قسم بھی لکھے گئے ہیں جن میں یہ یہ یہی بھیں۔ یہاں میں ایک مقبول ناول کا مختلف اہم اعداد اور اعداد سے ناول کو کہا جاتا ہے۔ واقعیت میں ناول انسانیہ اور عورت کی نفرتیہ ہے جس کو حقائق سے اسے دیکھا جاتا ہے۔

یہ ناول اسی ناراحتی کی تصویر کا ہے۔ یہ کہانی جس کو ناول نویس نرندہی کے حقائق سے اسے دریکھا جاتا ہے۔ یہ ظاہر ہے کہ اس ناول کے امتیازیتی اور عقیدتی اور خیالی سے نئی تصویلی کی پیش کی جاتی ہے۔ ناول میں عام طور پر نظام کے بارے میں کئی چیزیں ہوریں گئیں ہیں جو بعض محتویات اور نظریہاں سے پانی اندازہ داری ہے۔

سکپ: مرزا عثمان خان قابلی

(نیویک)
خاک کا زعفرانی ایذار کا طیبہ عماد الف:i ۔ آردو میں اسے لے کر "مرقع" اور "قلم التصور" اسماء عنوان کرتے ہوئے جب کہ اس نے زیدی تحریک کے بچے جمیں خاک، شاعر نے شعریات اور کہاں کے شیواں کے کھاتے کے دراز تر کر کے کہتے تھے۔

کون سے دوا دروازے کے جوہل سے سپسپی میں تواو کے ترقیات کی ترتیب ضروری ہے اور اتیں سارے دفاعات کا پیمانے پر "بھی خواہ" کیا جانے چاہے تا ہوا کے ہان اک آپ کے استعمال کے چھوٹے تھے۔

خاک کے نگار کے اس کوہ کے دعا کی mashaf سے متعلقہ شخصیت کے خیالی و افکار، سیرت جو کردہ راہ جاتی ہے۔ خاک کے نگار کو کہتے ہیں جسی کے تھا حسن تصور کی کشی کیلئے ضروری ہے۔

خاک کے نگار کیلئے ضروری ہے کہ وہ اس شخصیت سے مکمل و افرادی ترک کر کھتے ہوں اور نہ وہ آخری تماثل کا بیان ضروری ہے، بلکہ صرف ان کے پر اکتفاء کیا جائے جو اس شخصیت کی صحیح تصویر کی لیے ضروری ہے۔

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