

SSLC- STATE BOARD
SUBJECT – SCIENCE
MOST LIKELY QUESTIONS WITH SOLUTIONS

I. One-mark questions:

1. Define gangue.

A: It is worthless rock or mineral in which valuable minerals are found.

An example of gangue is the rock surrounding a deposit of gold.

2. What is Mono hybrid Cross?

A: A type of cross in which one pair of contrasting characters are considered.

3. Define Variation.

A: Variation is the change in characters or traits of an individual which has not existed in their parents.

4. What is Power of accommodation of an eye?

A: The ability of the eye to focus both near and distant objects, by adjusting the focal length is called power of accommodation of an eye.

5. Which Part of the bryophyllum helps for Vegetative Propagation?

A: Leaf part.

6. Now a days Government is Promoting non-Conventional sources of energy. give reason.

A: The non-conventional sources of energy is a renewable energy that it is sustainable and will never run out. They provide clean energy because they are non-pollutant and non-contributor to greenhouse effects and global warming. They are very economical in use as compared to conventional sources. The conventional sources of energy are depleting very fast and we are dependent on imports of petroleum and natural gas to meet our needs. Hence government is promoting non-conventional sources of energy.

7. Name the largest cell present in the human body.

A: Neuron – largest cell

9. Define Speciation?

A: Speciation, the formation of new and distinct species in the course of evolution.

Or

It is the process of formation of new species from a pre-existing species.

10. In a paper mill bleaching powder was not added while preparing paper pulp. the paper obtained was yellowish brown in colour what is the reason for this?

A: The wood pulp used to make paper undergoes chemical pulping process in which the lignin is dissolved. After the chemical pulping process there are still some traces of lignin present in the wood pulp. This lignin gives the yellowish-brown color to the paper and reduce the brightness of the paper. Hence to remove any color from the lignin bleaching is done to make the paper white.

11. What is phototropism?

A: Movement or bending of shoot towards light is called phototropism.

12. Water mixed with potash alum is taken in beaker 'A' and salt solution is taken in beaker 'B'. Light is passed through both the beakers. In which beaker the path of light is visible? why?

A: Beaker A will show path of light. It's a (colloidal solution) Heterogeneous mixture. Large molecules of heterogeneous mixture deviate the path of light to make it visible.

13. What is oxidation?

A: Oxidation is the loss of electrons during a reaction by a molecule, atom or ion.

14. Mammals and birds have four chambered heart. Why?

A: Mammals and birds are warm-blooded animals. They constantly use energy to maintain their body temperature. They have higher energy needs and so they require more oxygen to produce energy. Thus, it is important that their oxygenated blood does not get mixed up with oxygenated blood.

15. Name any two substances that are responsible for causing biomagnification.

A: Harmful chemical substances like Pesticides and fertilizers.

16. Name the special tissue which nourish the Embryo in mother's womb.

A: Placenta

17. What are the sex chromosomes present in women?

A: Females typically have two of the same kind of sex chromosome (XX).

18. Write any two limitations of Extracting wind energy?

A: (i) Need a large open space to install a number of wind mills.

(ii) Wind mill parts are quite high and much costlier.

19. Define neutralization reaction.

A: A neutralization reaction is when an acid and a base react to form water and a salt and involves the combination of H^+ ions and OH^- ions to generate water.

20. Give an Example for growth dependent movement in plants.

A: Chemotropism. (any trophic movement)

21. State Mendeleev's periodic law.

A: Mendeleev's periodic law - "The properties of elements are the periodic function of their atomic masses".

22. Name the substance responsible for causing depletion of ozone layer.

A: Chlorofluorocarbons (CFCs)

23. write the pair of sex chromosomes present in human male cell.

A: A pair of sex chromosomes present in human male cell is XY

24. What is the SI unit of power of lens?

A: Dioptre

25. A student can see nearby objects clearly but cannot see distance object distantly. Name the disorder associated with his Eye.

A: Myopia (Near sightedness)

26. Write the chemical name and chemical formula of bleaching powder.

A: Bleaching powder: Chemical name – Calcium oxy chloride

Chemical formula: $CaOCl_2$

27. Why aluminium Oxide is referred as amphoteric oxide?

A: Aluminium oxide is an amphoteric substance, meaning it can react with both acids and bases.

28. What is the main function of insulin hormone in human body?

A: The main function of insulin hormone in human body is regulating the blood sugar level.

29. The power of the lens is 2.0 D find the focal length of the lens.

A: The power (P) = + 2D.

Focal length (f) = $1/p$

F = $\frac{1}{2}$ D

F = 0.5m or 50 cm.

So, the lens is biconvex with focal length 50cm.

30. How does the creation of variations in a species promote survival?

A: Sometimes for a species, the environmental conditions change so drastically that their survival becomes difficult. For example, if the temperature of water increases suddenly, most of the bacteria living in that water would die. Only few variants resistant to heat would be able to survive. If these variants were not there, then the entire species of bacteria would have been destroyed. Thus, these variants help in the survival of the species.

31. Why milkman adds a very small amount of baking soda to fresh milk?

A: Baking soda is a base. It is added to fresh milk to prevent the curdling of milk because it neutralizes the lactic acid produced in the milk by the action of bacteria. keeps the milk unspoil for little more time than usual time.

32. Define focal length of a lens.

A: Focal length is the distance between the pole of the mirror and principal focus denoted by f.

33. What is redox reaction?

A: A redox reaction is any reaction involving a transfer of electrons from one atom to another.

34. Why sudden activities in man causes muscle cramps?

A: In order to release more energy to perform sudden activity, pyruvate is converted into lactic acid in the lack of oxygen. Formation of lactic acid in causes Muscle cramps.

35. Which of the following Hydrocarbons undergo addition reaction?

a) C₂H₆, b) C₃H₈ c) C₃H₆ d) C₂H₂ e) CH₄

A: Unsaturated hydrocarbons undergo addition reactions. Being unsaturated hydrocarbons like C₃H₆ and C₂H₂ undergo addition reaction.

36. Draw the food chain of grassland.

A: Grasses / plants → Grass hopper → frog → snake → Hawk

37. Pollination is followed by fertilization. What is your opinion in one sentence?

A: Pollination and fertilization are two ways of producing offspring. For fertilization there is need of male and female gamete. The transfer of pollen grains (male gamete) takes place by pollination and forms zygote. Hence pollination is followed by fertilization.

38. What is an eco-system?

A: Eco-system is the interaction between living and non-living things is a particular area.

39. Define 1 dioptre of power of a lens.

A: 1 dioptre is defined as the power of a lens of focal length 1 metro.

$$1 D = 1 \text{ m}^{-1}$$

$$P = \frac{1}{f(m)}$$

40. What is the meaning of biomass?

A: The waste material of living organisms and dead living organisms (plants, animals) is called biomass.

II. TWO-MARK QUESTIONS:

1. What is Electromagnetic induction?

A: The phenomenon by which electric current is generated by changing the magnetic field lines is called electromagnetic induction.

2. What is an Armature? What is its advantage?

A: Armature: It is a rectangular iron core wrapped by the copper coil through which electricity passes and due to magnetic field, it experiences a force and rotates.

Advantages:

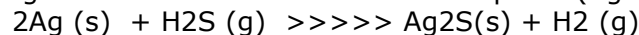
1. You can turn the electromagnet by switching ON or OFF the current.
2. You can reverse the poles of the electromagnet by reversing the direction electric current flow in the coil.
3. The magnetic field strength can be changed by changing the amount of current in the coil.
4. An electromagnet can easily be made more powerful than a permanent magnet.

3. The soil in a field is highly acidic. List any two materials which can be added to the soil giving specific reason.

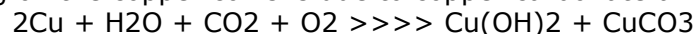
A: Calcium carbonate, calcium oxide, magnesium oxide or magnesium carbonate can be added to neutralize the acidity of the soil.

4. A student has been collecting silver coins and Copper Coins. One day he observed a black coating on Silver Coins and green Coating on Copper Coins. Give the Chemical Name of black and green Coating. How are they formed?

A: Black coating on silver coins is due to silver sulphide (Ag₂S)



Green coating on the copper coins is due to copper carbonate and copper hydroxide



5. Why do herbivores have longer small intestine than Carnivores ?

A: Herbivorous animals have longer intestines than that of carnivorous animals. This is because their diet is grass and plants, made up of fibre and cellulose which are hard to digest. As a result the herbivorous animals need a longer digestive track to digest their foods completely.

6. Why is it necessary to separate Oxygenated and deoxygenated blood in Mammals and birds?

A: The separation of oxygenated and deoxygenated blood provides high oxygen supply to the organs. This is useful in animals that have high energy needs such as birds and mammals which constantly use energy maintain constant body temperature.

7. List two Methods of Producing Magnetic field.

- A:** (i) A bar magnet
(ii) A straight current carrying conductor.
(iii) A solenoid

8. List any two Properties of Magnetic lines of force.

A: (i) A magnetic field lines of force are closed continuous curves, they begin from north pole and enter into south pole.

(ii) Inside the magnet, lines of force are from south to north where as outside the magnet these are from north to south.

9. Distinguish between Exocrine glands and Endocrine glands.

A:

| Endocrine Glands | Exocrine Glands |
|--------------------------------------|--|
| 1. These are type of ductless glands | 1. May or may not have ducts |
| 2. Secretes into blood | 2. Pour their secretion directly at the site of action |
| 3. Secretes hormones | 3. Secretes enzymes |

10. How are involuntary actions and reflex actions different from each other?

A:

| Involuntary actions | Reflex actions |
|--|--|
| 1. Actions that takes place by itself but are controlled by the brain are involuntary. | 1. Actions that takes place all of a sudden and are controlled by spinal cord. |
| 2. They do not have any circuit like reflex actions | 2. They have a circuit called reflex arc. |

11. Write the differences between Concave and Convex Mirror.

A:

| Concave mirror | Convex mirror |
|--|--|
| 1. If inner side of spherical mirrors is reflecting it is called as concave mirror | 1. If outer side of the spherical mirror is reflecting it is called as convex mirror |
| 2. Concave mirror form real and inverted image | 2. Convex mirror form virtual erect images. |
| 3. example: Head light, torch light | 3. Rear side mirror of Vehicles, optical instrument |

12. The first trophic level in a food chain is always a green plant why?

A: The first trophic level of the food chain is always occupied by green plants which are termed to be producers. This is because producers absorb sunlight, abiotic factor and fix it into food chain. This energy is transferred to organisms in other trophic levels of the food chain.

13. Why does Micelle formation takes place when soap is added to water? Will a Micelle be formed in other solvents such as ethanal also?

A: Soap has hydrophilic and hydrophobic part. Hydrocarbon portion is hydrophobic which form clusters called micelles.

No, will micelle formation will not take place ethanol.

14. Why are carbon and its compounds used as fuels for most applications?

A: Carbon and its compounds used as fuels for most applications as they are inflammable and have calorific values.

16. What is meant by three types of 'R' to save the environment? Explain with examples how would you follow the 3 Rs in your School to save the environment.

A: The three types of 'R' are Reduce, Reuse, Recycle.

The 3-R's can be followed in the following ways:

1. Switch off! the fans and bulbs when not in use,
2. Reuse of paper, polythene bags, etc.,
3. Reduce the wastage of water/paper or any other item.

17. Give reasons:

a) Why is a normal eye not able to see clearly the objects placed closer than 25 cm?

b) Why is red color selected for danger signals.

A: (a) Ciliary muscles can not contract the lens beyond a limit that is why a normal eye is not able to see objects closer than 25cm.

(b) Red color scatters less and visible more

18. What are the disadvantages of using fossil fuels?

A: Disadvantages of fossil fuels:

- (i) They cause air pollution
- (ii) The oxides of nitrogen and Sulphur are acidic which leads to acid rain.
- (iii) Carbon dioxide gas produces greenhouse effect.
- (iv) Fossil fuels are non-renewable source energy.

19. Name the following.

a) liquid metal at room temperature

b) Non-metal that conduct electricity.

A: (a) liquid metal at room temperature - Mercury

(b) Non-metal that conduct electricity - Graphite

20. Mention the structures that protect the following parts of human nervous system.

a) Brain b) Spinal cord.

A: (a) Brain: It is protected by a bony box in the skull called cranium and meninges.

(b) Spinal cord: It is protected by membrane called meninges

21. Which part of brain controls the following actions.

a) Walking in a straight-line b) Salivation.

A: (a) Walking in a straight-line – Cerebellum (b) Salivation- Medulla

22. Differentiate between self-pollination and cross-pollination in flowers.

A:

| Self-pollination | Cross-pollination |
|--|---|
| 1. The pollen grains from the anther of a flower are transferred to the stigma of the same flower is called self-pollination | 1. The pollen grains from the anther of a flower of one plant are transferred to the stigma of a flower on another plant is called Cross-pollination. |
| 2. Flowers do not depend on other agencies for pollination | 2. Agents like wind, water, insects required for pollination |
| 3. Flowers are not attractive nor do not they produce nectar | 3. Flowers attract insects by various means like coloured petal, scent and nectar |

23. State the two laws of reflection of light.

A: The two laws of reflection of light are:

(i) The incident ray, the reflected ray and the normal all lie in the same plane.

(ii) Angle of reflection = Angle of incidence

24. Write the balanced chemical equations for the following reactions.

a) Exposure of silver bromide to sunlight

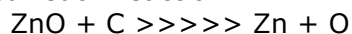
b) Reaction of Iron with copper sulphate solution.

A: (a) $2\text{AgBr (s)} \gggggg \text{2Ag (s)} + \text{Br}_2 \text{(g)}$
Silver Bromide Silver Bromine

(b) $\text{Fe} + \text{CuSO}_4 \gggggg \text{FeSO}_4 + \text{Cu}$
Iron Copper Sulphate Ferrous Sulphate Copper

25. Define redox reaction? Give an Example.

A: A reaction in which one reactant gets oxidized while the other gets reduced during a reaction is called redox reaction.



26. Construct a food chain observed in the following Ecosystems.

a) Forest b) Grassland.

A: (a) Forest:

Grass \longrightarrow Deer \longrightarrow Lion

(b) Grass land:

Grass \longrightarrow Insects \longrightarrow Frog \longrightarrow Snake \longrightarrow Hawk

27. What are fossils? Mention the strategies followed to determine the age of fossils.

A: Fossils: The remains and / or impressions of organisms that lived in the past.

The strategies followed to determine the age of fossils are

*** Relative method:** When dug into the Earth, the fossils closer to the surface are more recent as compared to the fossils found in deeper layers.

***Carbon dating method:** The fossils can also be dated by detecting the ratios of different isotopes of the same element in the fossil material.

28. What are the limitations of the energy that can be obtained from oceans?

A: Limitations:

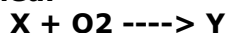
(a) High dams are required to be built to convert tidal energy into electricity which demands lots of cost.

(b) Very strong waves are required which are not possible all the time.

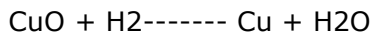
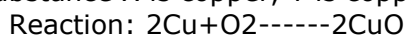
29. "Construction of dams may be disadvantage" Justify the statement with suitable reasons.

- A:** 1. It leads to deforestation causing loss of biodiversity.
2. It submerges the vegetation on its construction site and then it rots under anaerobic condition to produce methane a greenhouse gas
3. It displaces large section of population living on the site where the dam has to be created. Hence it creates the problem of satisfactory rehabilitation.

30. 'X' is a metal, on heating metal 'X' with oxygen forms compound 'Y' which will be black in colour on passing hydrogen gas through compound 'Y', metal 'X' and water is obtained.



A: Substance X is copper, Y is copper oxide



Substance oxidized: H₂

Substance reduced: CuO

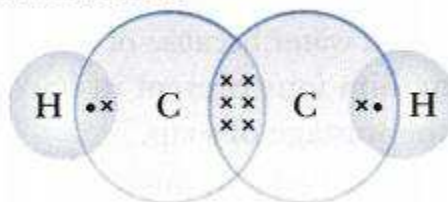
33. What are the precautions that can be undertaken to avoid overloading in domestic circuits?

- A:** Following precautions should be taken to avoid the overloading of domestic circuits: (a) Do not use too many appliances at the same time.
(b) Use the appliances within the safe limit of electric circuit.
(c) Do not connect too many appliances in a single socket.

34. Write the electron dot structure showing the formation of Ethyne molecule.

A: Ethyne (Acetylene)-C₂H₂

Electron-dot structure:



35. Write the molecular and structural formula of Bromohexane and chloro pentane

A: Bromohexane: C₆H₁₃Br

structural formula Br-CH₂-CH₂-CH₂-CH₂-CH₂-CH₃.

Chloropentane: C₅H₁₁Cl

Structural Formula: CH₃ - CH - CH₂ - CH₂ - CH₃



36. A lamp draws a current of 0.5A when it is connected to 60V source. What is the resistance of the lamp.

A: V = 60 Current = 0.5A

V = IR Ohm's law

$$R = V/I$$

$$R = 60/0.5$$

$$= 600/5$$

$$= 120$$

the resistance of the lamp is 120 ohms

37. What is Lymph? Write two functions.

A: Lymph is a colourless fluid containing white blood cells and less protein than plasma.

- Functions: (i) Carry digested fat from the small intestine
(ii) Drains excess fluid from extracellular space back into the blood.

38. What are the differences between the transport of materials in xylem and phloem?

A: The differences between the transport of materials in Xylem and Phloem are:

| Xylem | Phloem |
|---|--|
| 1. Transport of water and minerals | 1. Transport of food and hormones |
| 2. Only upward movement (Uni directional) | 2. Upward and downward movements (bidirectional) |

39. What is presbyopia? What is the main reason for this defect?

A: Presbyopia: It is the defect of human eye in which a person is unable to see the nearby as well as far off object clearly.

Reasons: (i) Decrease in the power of accommodation of eye due to ageing
(ii) Weakening of the ciliary muscles.

40. In a given pyramid T1 trophic level has 10,000 KJ

a) What will be energy level at T2, T3 & T4?

b) Which was the law applied here?

A: (a) Energy level at T2 – 1000, T3 – 100, T4 – 10

(b) 10% law is applied here.

41. Write the difference between resistance in series and parallel.

A:

| Resistance in series | Resistance in parallel |
|--|---|
| 1. Single path of flow of current | 1. Multiple path of flow of current |
| 2. The current through each of the component is same | 2. Voltage across each component is same |
| 3. Voltage across the circuit is the sum of the voltages across each component | 3. The total current is the sum of the currents through each component. |

43. The pH of a salt used to make tasty and crispy pakoras is 14. Identify the salt and write a chemical equation for its formation.

A: NaHCO₃-Sodium bi carbonate (Baking soda) is used to make tasty pakoras.

Equation: $\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \gggg \text{NH}_4\text{Cl} + \text{NaHCO}_3$

44. State the role of placenta in the development of embryo.

A: Placenta is a disc shaped structure between mother and embryo.

Functions: (i) Provides large surface area for glucose and O₂ to pass from mother to embryo.
(ii) Removal of wastes from embryo.

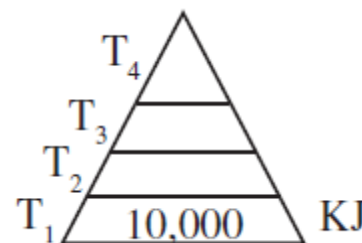
45. Write any four properties of Ionic compound.

A: 1-They are held by strong electrostatic force.

2-They have high melting and boiling point.

3-They are soluble in water because ions dissociate but not in organic compounds.

4-They undergo dissociation when electric current is passed through it.



47. Write the balanced chemical equations for the following.

a) Zinc + Silver nitrate

b) Barium chloride + potassium sulphate.

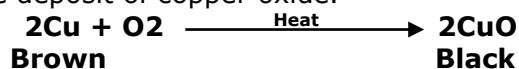
A: (a) $\text{Zn} + 2\text{AgNO}_3 \gggggg \text{Zn}(\text{NO}_3)_2 + 2\text{Ag}$

(b) $\text{BaCl}_2 + \text{K}_2\text{SO}_4 \text{ ----> } \text{BaSO}_4 + 2\text{KCl}$

48. A shiny brown colored element 'X' on heating in air become black in color.

Name the element 'X' and the black colored compound formed.

A: The shiny brown colored element 'X' is copper. When it is heated in air, it becomes black due to the deposit of copper oxide.



49. Why are forests considered "bio diversity hot spots"?

List two ways in which an individual can contribute effectively to the management of forests and wildlife.

A: Biodiversity is measured by the number of different forms found in an area. In a forest various species are available which include bacteria, fungi, ferns. Plants, insects, birds, reptiles, mammals etc. Forests are therefore biodiversity hotspots.

An individual can contribute in management of forest and wildlife by

- (i) Avoiding cutting of forest and killing of wildlife.
- (ii) Educating people about importance of forest and wildlife.

50. Select alkene & alkyne from the following.

C₆H₁₂, C₃H₄, C₂H₄, CH₄, C₄H₈, C₅H₈,

A: C₄H₈, C₂H₄ are alkenes

C₅H₈, C₃H₄ is alkyne

CH₄ is alkane

51. What are homologous series? Which two of following Organic compounds belong to the same homolog's series.

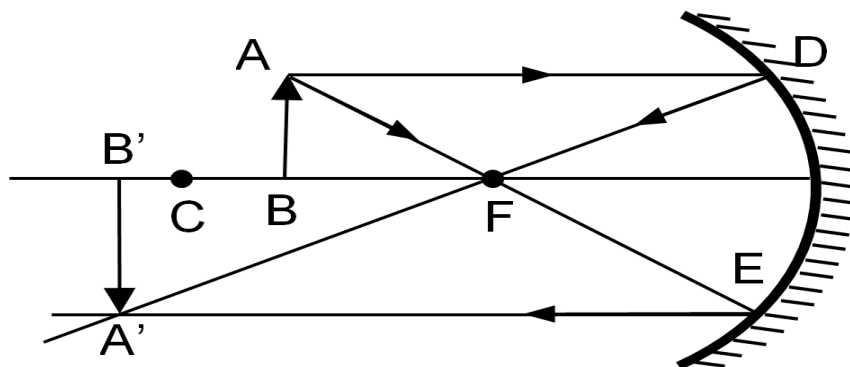
a) C₂H₆ b) C₄H₈ & C₄H₁₀ c) C₄H₈ d) C₅H₈ & C₄H₈

A: Homologous series: It is a series of organic compounds having a general formula, same functional group having similar chemical properties, gradation in physical properties with a difference of CH₂ group between successive members.

C₄H₈ and C₃H₆ belong to same homologous series

CH₄ and C₂H₆ both these organic compounds belong to one homologous series : alkane

51. Draw a ray diagram showing the formation of image when the object is placed between C and F of a concave mirror.



III. THREE-MARKS QUESTIONS:

1. The position of three elements A, B and C in the periodic table are shown below.

| Group 16 | Group 17 |
|----------|----------|
| - | - |
| - | A |
| - | - |
| B | C |

- a) State whether A is a metal or nonmetal.
- b) State whether C is More reactive or less reactive than A
- c) Will C be larger or smaller in size than B?

A: (a) A is non-metal

(b) C is less reactive than A

(c) C is smaller in size than B

2. What are the advantages of sexual reproduction over asexual reproduction?

A: Advantages of sexual reproduction over asexual reproduction:

- (i) Sexual reproduction takes place in the presence of male and female individuals.
- (ii) The offspring's produced are genetically variable. Such organisms are successful in environment.
- (iii) It promotes diversity and evolution.
- (iv) It plays important role in evolution of species.

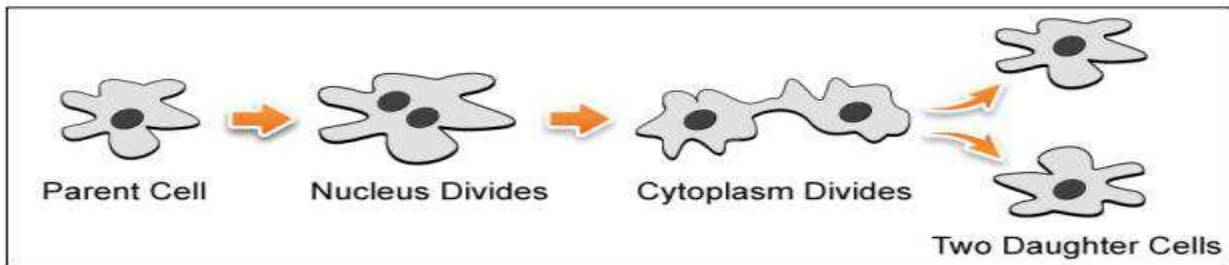
(v) It provides chances of many variation.

3. Explain binary fission with an example.

Binary fission: It is the division of one cell into two similar or identical cells.

Example: Amoeba

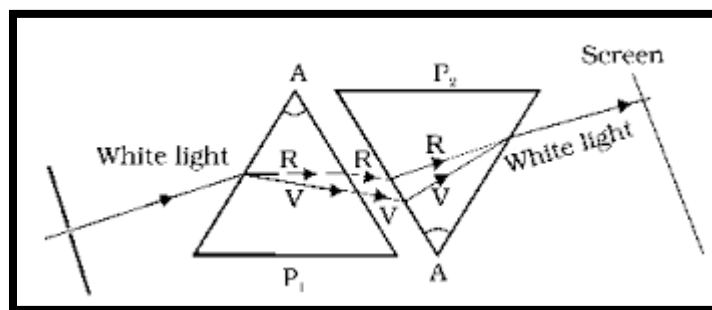
In Amoeba, the nucleus first divides into two, followed by the division of cytoplasm. The cell finally splits into two daughter cells. So, from one parent Amoeba two daughter amoebae are formed.



4. How can we recombine the spectrum of white light. Draw a diagram to illustrate it.

A: Things needed: Two prisms, Screen

Method: Send a white incident light into a glass prism. The incident white light splits into seven colours of the spectrum. Then keep an inverted prism near the first glass prism and allow seven colours to pass through it. It recombines and comes out as white light on the other side of the prism. This white light can be observed with or without screen.



5. Only variations that confer advantage to an individual organism will survive in a Population. Do you agree with this statement? Why or why not?

A: In species, variation that offer survival advantages are naturally selected. Individuals adjust to their environment with the help of these selected variations and these variations are passed on to their next progeny. Evolution of organisms occurs as a result of this natural selection.

How ever there can be some other variations, which do not offer any survival advantage. They come accidentally. Such variations in small population can change the frequency of some genes even if they not important for survival.

This accidental change in the frequency of genes in small populations is referred to as genetic drift. Thus, genetic drift provides diversity (variations) without any survival advantage.

6. Explain the terms analogous and homologous organs with examples.

(a) Analogous organs: Organs that have dissimilar origin and structure but perform similar function are called analogous organs.

Example: Wings of birds (sparrow), bat (a mammal), insects (cockroach) etc have same function flying, but are structurally different. Wings of birds have feathers, wing of bat is a skin fold between the fingers, wings of insects are membranous without bones.

(b) Homologous Organs: Organs that have similar origin and structure but perform different functions are called homologous organs.

Example: Inheritance pattern of limbs in amphibians (frogs), reptiles (lizards), birds (sparrow) and mammal (human) is same. The limbs in the above organisms perform different functions.

7. Define refractive Index. What is the meaning the refractive index of water is 1.33.

A: The refractive index of a medium is defined as the ratio of speed of light in vacuum to that of speed of light in medium.

"Refractive index of water is 1.33". It means the ratio of velocity of light in vacuum to the velocity of light in water is 1.33". Or

The refractive index of water is 1.33, meaning that light travels 1.33 times as fast in vacuum as it does in water. Hence the water has least bending effect of light.

It is not possible to have a medium with refractive index less than 1, because light travels much faster in only vacuum.

8. Write mirror formula. Write any 2 sign conventions for reflection in spherical mirrors.

Mirror formula: -

It gives the relationship between image distance (v), object distance (u) and the focal length (f) of the mirror and is written as

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

Where v is the distance of image from the mirror, u is the distance of object from the mirror and f is the focal length of the mirror. This formula is valid in all situations for all spherical mirrors for all positions of the object.

Sign Convention for Spherical Mirror:

- **Sign** is taken as + (positive) behind the **spherical mirror**. For example, if an image is formed behind the **mirror**, the distance of image is taken as + (positive) from pole along the principal axis.
- The height of is taken as + (positive) above the principal axis and taken as - (negative) below the principal axis.

9. The atomic number of two element A and B are 19 and 20 respectively which element exhibits highest metallic property? Why? Write the molecular formula of the compound formed when these elements combine with the element 'X' having atomic number '17'.

- Atomic no 19 is potassium and Atomic no 20 is Calcium.
- Calcium has high metallic property as we move from left to right in the periodic table ...
- Element X is Chlorine having atomic number 17.
- $\text{Ca} + \text{Cl} \text{ -----} > \text{CaCl}_2$
- Molecular formula of the compound is Calcium chloride.

10. What is pre-natal sex determination? why is it banned?

A: A: Pre-natal sex determination: It is a technique used to determine the gender of child in fetus form. Before the child is born when the baby is in mother's womb. Parents ask doctor about the sex. If it is a girl child they abort it.

It is banned: Prenatal sex determination has been prohibited by law because of indiscriminate female feticide. As a result of this, child sex ratio is declining at an alarming rate in some sections of our society. For a healthy society, the female-male sex ratio must be maintained.

11. What is contraception? Mention different methods of contraception. Which will be the safest method according to you?

A: Contraception: Any method which prevents conception/ pregnancy is called contraception.

Different methods of contraception are:

- Creating mechanical barriers in the body
- Changing hormonal balance in the body
- Implanting contraceptive devices in the body.
- Surgical method
- Abstinence (stopping sexual inter course)

12. a) Define power of the lens.

b) Find the power of a concave lens of focal length 2m.

A: (a) Power of lens is the reciprocal of its focal length. SI unit of power of lens is diopter.

(b) focal length $f = -2$ m (concave lens)

$$\text{So } p = \frac{1}{f} - \frac{1}{-2}$$

$$P = - 0.5\text{doptre}$$

13. List out the physical differences between metals and nonmetals.

A: Physical differences between metals and nonmetals:

| Property | metals | Non-metals |
|-----------------------------------|--|---|
| Luster | Have shining surface | They do not have shining surface expect Iodine. |
| Hardness | Generally hard | Generally soft |
| State | Exists as solids (expect mercury) | Solids or gaseous |
| Malleability | Can be beaten into thin sheets | Non-malleable |
| Ductility | Metals can be drawn into thin wires | They are non- ductile |
| Conductor of Heat and Electricity | Good conductor of heat and electricity | Poor conductor of heat and electricity |
| Density and melting point | High density and high melting point | Have low density and low melting point |

14. a) Define fission type of reproduction.

b) Differentiate between binary fission and multiple fission.

A: Fission: Many single celled organism-like protozoa and bacteria just split into two identical halves during cell division, leading to the creation of new organism.

For Ex: Amoeba, Paramecium, leishmania.

(b) Differences between binary fission and multiple fission

| Binary fission | Multiple Fission |
|--|--|
| (a) When a parent cell produces daughter cells it is called binary fission | (a) When a parent cell produces more than two daughter nuclei each surrounded by cytoplasm |
| (b) The parent nucleus divides into two and goes to two daughter cells | (b) The parent nucleus divides into many daughter nuclei each surrounded by cytoplasm |
| (c) It is usually during favorable conditions | (c) It is usually during unfavorable condition |
| (d) No protective covering is formed | (d) A protective covering cyst is formed |
| (e) It happens in different patterns as in amoeba | (e) No such patterns. Ex: Plasmodium |

15. (a) Define Regeneration.

b) Briefly explain budding process in hydra.

(a) Regeneration: It is the ability of an organism to give rise to a new organism/ individual from their body parts.

(b) (i) The body of hydra by any means is cut into number of pieces

(ii) Each piece contains specialized cells

(iii) These cells multiply and make large number of cells

(iv) From this mass of cells different cells undergo changes to become various cell types and tissues and which finally develops into a new organism.

16. a) Differentiate between homologous and analogous organs.

b) What are fossils?

A: (a) Differences between homologous and analogous organs

| Homologous Organs | Analogous Organs |
|--|---------------------------------------|
| They have same basic structural design | They have different structural design |
| They perform different function | They perform similar function |
| Their appearances are different | They have similar appearances. |

(b) Fossils: The remains and / or impressions of organisms that lived in the past.

17. a) What effect you observe when a light ray travel from one medium to another medium of equal refractive index?

b) What are the reasons of refraction of light.

c) The Refractive index of crown glass is 1.52 what is the meaning of this statement.

A: (a) When light travels from one medium to another having same refractive index it passes without deviation.

(b) Reasons for Refraction of light: This happens because as the wave enters the new medium it changes its speed. This difference of speed causes the wave front to bend which we detect as refraction.

(c) It is the refractiveness of light when it enters the crown glass.

Let the speed of light in crown glass be n

Refractive index of crown glass = speed of light in air / speed of light in crown glass

$$1.52 = \frac{3 \times 10^8}{n}$$

$$n = \frac{3 \times 10^8}{1.52}$$

$$n = 2 \times 10^8$$

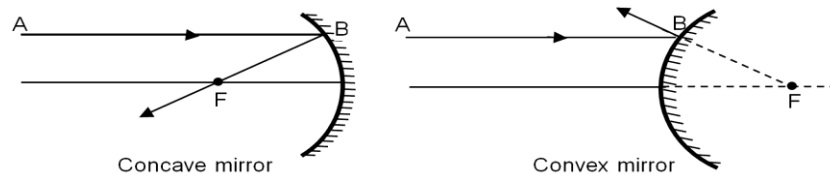
Therefore, the speed of light in crown glass is 2×10^8

18. List the Certain rule of spherical mirror Spherical mirror diagram.

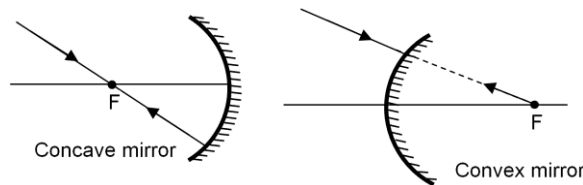
The position of the image formed by spherical mirrors can be found by taking two rays of light coming from a point on the object which intersect each other to form an image.

Following are the rules which are used for obtaining images formed by spherical mirrors.

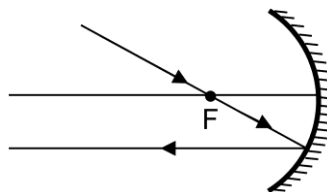
1. A ray of light which run parallel to the principal axis, after reflection, passes through the principal focus F of a concave mirror, or appears to pass through the principal focus of a convex mirror.



2. A ray of light passing through the centre of curvature in a concave mirror or a ray of light going towards the centre of curvature of a convex mirror is reflected back along the same path.



3. A ray of light passing through the principal focus of a concave mirror or appearing to pass through the principal focus of a convex mirror becomes parallel to the principal axis after reflection.



19. " Bio gas is a better fuel than animal dung cakes". Justify the statement.

A: 1. Cow dung cake has low calorific value i.e. 3.1 kJ/g than the Methane gas (5.5 kJ/g), a biogas constituent.

2. Bio gas is a clean fuel that burns without smoke and leaves no ash, unlike cow dung.

3. The by-product of biogas plants i.e. the spent slurry, being rich in nitrogen and phosphorus is a good manure

20. Out of two solar cookers, one was covered with a plane glass slab and the other was left open which of the two solar cookers will be more efficient and why?

A: A solar cooker covered by a plane glass slab will be more efficient.

This is because glass slab does not allow the heat radiation to escape from the solar cooker and hence the temperature of the solar cooker with glass slab increases more than the temperature of the solar cooker which is left open.

21. a) What is the principle of an electric motor?**b) What is the role of split rings in the electric motor?****c) What is over loading?**

A: (a) An electric motor works on the principle that a current carrying conductor placed in a magnetic field experiences force.

(b) The function of split ring (commutator) is to reverse the direction of current in the coil every half rotation

(c) Over loading: The current in a circuit depends on the rating of the appliances connected to it. The choice of wires depends upon the maximum current estimated to pass through them. If the total power rating of the appliances exceeds this permitted limit, they tend to draw a large current. This is known as overloading.

22. Explain the working of electric generator.

A: It works on the principle that "when a coil rotates in uniform magnetic field, the current is induced in the coil.

Working: Let the coil 'abcd' initially in horizontal position, be rotated anticlockwise, i.e., arm 'ab' moves downwards and 'cd' upwards. Due to the motion of the coil in the magnetic field, induced current is produced in the coil d to c.

According to Flemings right hand rule:

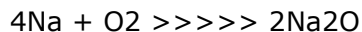
After half rotation, the arms of the coil interchange their positions. Arm 'ab' comes to the right and arm to the left. During the second half of the rotation, current flows from b to a in the arm 'ab'.

The two rings (R1 and R2) rotate with the coil and touch the two carbon brushes (B1 and B2) one by one. As a result, each carbon brush continues to have the same polarity (+ or -). Brush B2 always remains positive and brush B1 remains negative. The current so produced is called direct current (dc).

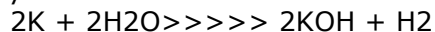
One carbon brush touches the coil arm moving up in the magnetic field while other carbon brush touches the coil arm moving down in the magnetic field. Therefore current always moves in one direction.

23. List out any three chemical properties of metals.

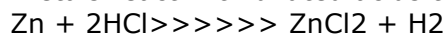
A: (i) Almost all metals react with oxygen to form metal oxide.



(ii) Only reactive metal reacts with water to form oxides or hydroxides and liberate hydrogen gas.



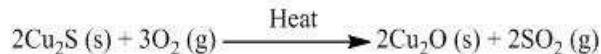
(iii) All metals react with diluted acids to produce salt and hydrogen gas.

**24. Explain the method of separation of metal of low reactivity series with an example.****A: Extracting Metals Low in the Activity Series**

- These metals have low reactivity.
- The oxides of these metals can be reduced to metals by heating alone.
- Cinnabar (HgS) is an ore of mercury which on exposure to heat first converts into mercuric oxide (HgO) and on further heating gets reduced to mercury.



- Another instance is reduction of Cu₂S (ore of copper) to copper by heating.

**25. How do Mendel's experiment show that traits may be dominant or recessive.**

A: (a) Mendel demonstrated that traits can be either dominant or recessive through his monohybrid cross.

He crossed true-breeding tall (TT) and dwarf (tt) pea plants. The seeds formed after fertilization were grown and the plants that were formed represent the first filial or F1 generation. All the F1 plants obtained were tall. Then, Mendel self-pollinated the F1 plants and observed that all plants obtained in the F2 generation were not tall. Instead, one-fourth of the F2 plants were short. From this experiment, Mendel concluded that the F1 tall plants were not true breeding; they were carrying traits of both short height and tall height. They appeared tall only because the tall trait was dominant over the dwarf trait. This shows that traits may be dominant or recessive.

26. What are the advantages and disadvantages of using solar cooker? Are there places where solar cookers would have limited utility?

A: Advantages:

- It cooks food without causing pollution
- It is economical to use a solar cooker
- It is easy to handle a solar cooker
- The nutrients of food do not get destroyed

Disadvantages

- It cannot be used at night and in cloudy day
- It takes more time to cook food
- It cannot be used for baking and frying purpose
- Solar energy is not available at all time and at all the place

Yes, there are places where solar cooker would have limited utility these are the places where days are too short or cloud covers them round the year. There solar cooker cannot be used.

27. a) Be, Mg and Ca are the first three elements of 2nd group. Which of these elements has highest atomic size? Why?

b) What are metalloids?

A: (a) Among Be, Mg and Ca, the element Ca possess largest atomic size. Because Atomic size increases down the group and decreases across a period (left to right).

(b) A metalloid is a chemical element that exhibits some properties of metals and some of nonmetals.

28. a) A part of periodic table is given. Which among these is more electro positive? Why?

b) What is electro positivity?

| | |
|------------------|------------------|
| Li ₃ | |
| Na ₁₁ | Mg ₁₂ |

(a)Na (Sodium) is more electro positive.

Because **sodium** has one **more** quantum shell than lithium. ... As a result of this, **sodium's** ability to pull onto electrons is lower than that of lithium's. Thus, **sodium** is **more electropositive** than lithium.

(b) Electro positivity: The elements that can easily lose electrons to form positive ions are called electro positive element.

29.(a) Na, Mg, Al, Si and P are the first 5 elements of 3rd period, which among these elements is more electropositive? Why?

b) Arrange the above elements in the decreasing order of their atomic size.

A: (a) Na is more electropositive. It is so as electro positivity decreases from left to right across a group.

(b) Decreasing order of their atomic size: **Na>Mg>Al>Si>P**
(1.90 > 1.45>1.18>1.11> 0.98)

30.

| 15th group | 17th group | 18th Group |
|------------|------------|------------|
| - | - | - |
| - | B | - |
| A | - | - |
| - | - | C |

By considering the positions of elements in modern periodic table. Answer the following questions.

a) Which Element is chemically inert?

b) Which Element is a metalloid?

c) Which Element is a halogen?

A: (a) Chemically inert element is C (18th group)

(b) Metalloid is element A (15th group)

(c) Halogen is element B (17th group)

VI. Four-mark questions:

1. a) Explain how evolution is related to classification of living beings.

b) "Fossils are the solid evidences to study evolution of life" Justify this statement.

A: (a) The method of arranging organisms into groups on the basis of similarities and differences is called classification.

Evolution on the other hand refers to a slow, gradual and continuous process by which the previously existing organisms develop into existing living organisms.

All living things are identified and categorized on the basis of their body design in form and function. Once a certain body design comes into existence, it will shape the effects of all other subsequent design changes, simply because it already exists. So, characteristics that came into existence earlier are likely to be more basic than characteristics that have come to existence later. This means that the classification of life forms is closely related to their evolution.

(b) Fossils provide solid evidence that organisms from the past are not the same as those found today, and fossils show a progression of evolution. Scientists determine the age of fossils and categorize them from all over the world to determine when the organisms lived relative to each other. The resulting fossil record tells the story of the past and shows the evolution of form over millions of years. For example, scientists have recovered highly detailed records showing the evolution of humans and horses.

2. a) Explain the process of sex determination in human beings.

b) Explain how homologous and analogous organs help in the study of evolution of life.

A: (a) In human beings the female has two X chromosomes and the male has X and Y chromosomes. Therefore, the female is XX and the males are XY

The gametes as we know, receive half of the chromosomes. The male gametes have 22 chromosomes and either X or Y sex chromosome.

Types of female Gamete: 22 + X or 22 + Y.

However, since the female has XX sex chromosomes, their gametes can be only X chromosomes.

Types of gametes: 22 + X

Thus, the mother provides only X chromosomes. The sex of the baby is determined by the type of the male gamete (X or Y) that fuses with the X chromosome of the female.

(b) (i) Homologous Organs: Forelimb of human and bird are homologous organs. They have same structural design and development origin but have different functions and appearance.

Homologous organs help us to understand that the organism has evolved from a common ancestor. The more common characteristics the two species are more closely they are related.

(ii) Analogous Organs: Analogous organs are those organs which have different basic structural design and development origin but have similar appearance and perform similar function.

Example: The wings of bird and bats look similar but have different design in their structure.

They have a common function of flying but their origins are not common. So, birds and bats are not closely related.

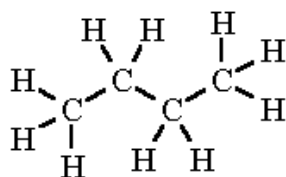
3. a) Write the Structural and molecular formulae of given carbon compounds.

i) Butane ii) Benzene.

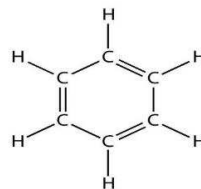
b) Write the electron dot formula of

i) Ethane ii) Benzene.

A: (i) Butane: C₄H₁₀

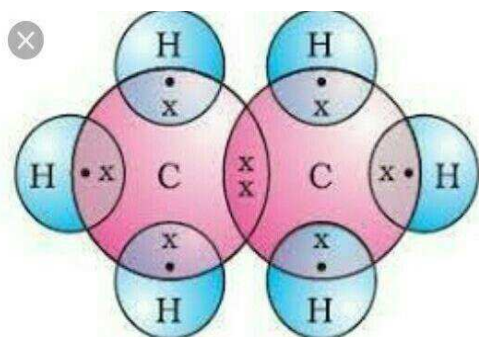


(ii) Benzene : C₆H₆

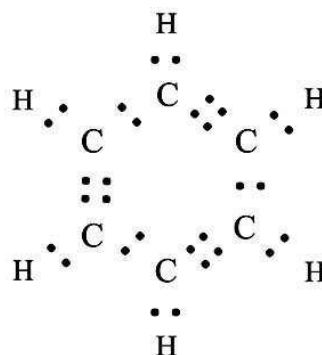


(b) Electron dot structure:

(i) Ethane (C₂H₆)



(b) Benzene (C₆H₆)



4. Insulated copper wire is wound around the cylinder and connected to galvanometer. What happens. Why?

- a) Bar magnet pushed in
b) Bar magnet kept out
c) Bar magnet pull
d) Number of turns increases
e) Bar magnet kept stationary

b) State the rule used to find the direction of induced current.

OR

In Faraday's Coil - Magnet experiment what changes do you observe in the galvanometer in the following situations.

- a) Magnet and coil are kept stationary.
b) Magnet is pushed inside the coil.
c) Magnet is pulled out of the coil.
d) Magnet is pushed forcibly in the the coil.

OR

A coil of insulated copper wire is connected to a galvanometer. What will happen if a bar magnet is.

- a) i) Pushed into the coil, its north pole entering first.
ii) With drawn from inside the coil.
iii) Held stationary inside the coil?
b) State the rule used to find the direction of induced current.

A: a) When a bar magnet is pushed inside the coil, an induced current is setup in the coil as the magnetic flux linked with coil changes continuously and galvanometer deflects towards right side.

b) When bar magnet is kept away from coil, as there is changing in magnetic flux linked to coil, induced current is setup and galvanometer deflects in opposite direction.

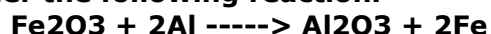
c) When the north pole is pulled out, the flux decreases, so the induced current will have an associated magnetic field pointing into the solenoid to try to oppose the change.

(d) As the number of turns increases the deflection will increases.

(e) Bar magnet kept stationary: There will be no deflection.

(b) Fleming's Right-Hand Rule determines the direction of induced current.

5. Consider the following reaction.



In the above reaction name the following.

- a) Substance get oxidized
b) Substance which is reduced
c) Reducing agent
d) Oxidising agent.

A: (a) Substance get oxidized is Aluminium (Al)

- (b) Substance which get reduced is Iron (Fe)
- (c) Al is reducing agent.
- (d) Fe₂O₃ is oxidizing agent

6. Write the balanced chemical equations of

a) Lime stone when heated gives quick lime and carbon di oxide.

b) Sodium sulphate reacts with barium chloridc to give barium sulphate and sodium chloride.

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

d) Sodium reacts with water to form sodium hydroxide and hydrogen gas.

A: (a) CaCO_3 (Limestone) = CaO (Quicklime) + CO_2 (g)

(b) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow 2\text{NaCl} + \text{BaSO}_4$

(c) $2\text{H}_2\text{S}(\text{g}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{SO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$

(d) $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$

b) List the properties of magnetic lines of force.

A: Magnetic lines of force have a number of important properties, which include:

- *They seek the path of least resistance between opposite magnetic poles.
- *In a single bar magnet as shown to the right, they attempt to form closed loops from pole to pole.
- *They never cross one another. They all have the same strength. Their density decreases when they move from an area of higher permeability to an area of lower permeability
- *Their density decreases with increasing distance from the poles.
- *They flow from the south pole to the north pole within a material and north pole to south pole in air.

8. a) State Fleming's right hand rule.

b) Briefly explain the construction and working of electric generator.

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

(b) Refer Q no 22. (3-mark questions)

9. a) What are the limitations of Constructing dams.

b) What are the different strategies that we can undertake the conserve wildlife.

A: (a) Limitations of construction of dams are

1. It leads to deforestation causing loss of biodiversity.
2. It submerges the vegetation on its construction site and then it rots under anaerobic condition to produce methane a greenhouse gas
3. It displaces large section of population living on the site where the dam has to be created. Hence it creates the problem of satisfactory rehabilitation.

(b) These are:

1. Afforestation and reforestation has to be encouraged.
2. Government has to set up biosphere reserves, national parks, wildlife sanctuaries in different parts of the country.
3. Hunting of animals and birds is banned
4. Poachers and hunters are penalized
5. Project tiger, jungle lodges are some of the projects can help to conserve the wildlife.

10. a) What is speciation? List four factors that could lead to speciation?

b) Which factor cannot be a major factor in speciation of a self-pollinating plant species?

Explain.

A: (a) It is the process of formation of new species from a pre-existing species.

The four factors that leads to speciation are:

(i) Genetic drift (ii) Natural Selection (iii) Reproductive isolation (iv) Geographical isolation.

(b) In case of plant species with self-pollinating flowers the factor reproducing isolation will not be a major factor, because the plant is not dependent on any other species for reproduction but has male and female parts in same flower or plant. Thus, there is no effect of reproducing isolation.

11. How do Mendel's experiments show that the

a) Traits may be dominant or recessive.

b) Traits are inherited independently.

A: (a) Mendel's Monohybrid cross: When pea plants of a particular trait having contrasting characters are crossed with each other produce F1 progeny that express dominant trait. When the progeny is self-crossed then the traits are separated in F2 progeny and the recessive trait is also expressed.

(b) Mendel's dihybrid cross: When plants with two contrasting traits are crossed, the dominant traits express themselves in F1 generation. When the progeny or F1 are self-crossed, traits separate in F1 generation in 9:3:3:1 ratio. It suggests that the traits are inherited independently.

12. a) Differentiate between roasting and calcination. Explain the two with the help of suitable chemical equations. How is Zinc extracted from its ore?

b) Name two oxides that can be used to reduce metal oxides to metals.

A: Roasting: It is a process of heating the concentrated ore to a high temperature in presence of air. Generally, sulfide ores are roasted.

Example: $2 \text{ZnS} + 3 \text{O}_2 \rightarrow 2 \text{ZnO} + 2 \text{SO}_2$

Calcination: It is a process of heating ore in the absence of air to a high temperature but insufficient to melt the ore. Generally, carbonates and hydrated ores are calcined.

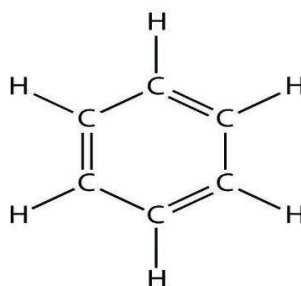
Example: $\text{ZnCO}_3 \rightarrow \text{ZnO} + \text{CO}_2$

Zinc is extracted from the Zinc ore i.e. zinc blende with the help of carbon reduction in the specially designed furnaces. Process contains many steps such as roasting i.e. concentrated ore is heated in the furnace at a temperature 900 degree Celsius and after heating the ZNO is obtained which is further reduced to zinc.

13. a) Write the structure of Benzene.

b) Explain the mechanism of the cleaning of action of soap.

A: (a) The structure of Benzene: C_6H_6



(b) Soap has hydrophobic and hydrophilic part. Hydrophobic part is hydrocarbon which forms cloister of molecules called micelle. They attract dirt, grease, etc. Whereas hydrophilic part attracts water, dirt, grease etc. is washed away with the help of water.

14.a) What are homologous series?

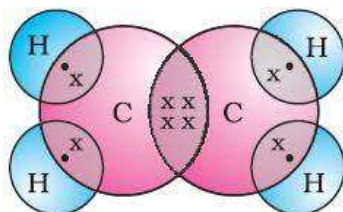
b) What is hetero atoms?

c) Write the electron dot formula of ethene.

A: (a) Homologous series: It is a series of organic compounds having a general formula, same functional group having similar chemical properties, gradation in physical properties with a difference of CH_2 group between successive members.

(b) **Hetero atoms:** A heteroatom is any atom that is not carbon or hydrogen. usually, the term is used to indicate that non-carbon atoms have replaced carbon in the backbone of the molecular structure.

(c) **Electron dot structure of Ethene (C_2H_4)**



15. Describe the function of Nephron with diagram.

A: Nephrons are small tube-like structures present inside the kidney of human. The nephron can be divided into two

(i) Bowman's capsule: It is a small cup-like structure. It has a tuft made up of a bunch of renal arteries. It is called glomerulus.

(ii) The Bowman's capsule extends into a coiled tube convoluted tubule. It extends further into a long thin loop. This loop again broadens and terminates into a collecting duct. The collecting duct attached to many nephrons.

The tubular part of nephron is covered by a network of blood capillaries.

Function Of nephrons: They are filtration units (excretory units). They filter the blood passing through the kidney.

(Draw the diagram)

