Class X Session 2026-27
Subject - Science
Sample Question Paper - 8

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

Section A

1. _____ is a product of meiosis. **[1]**

   a) Megaspore mother cell b) Primary endosperm nucleus

   c) Microspore mother cell d) Megaspore

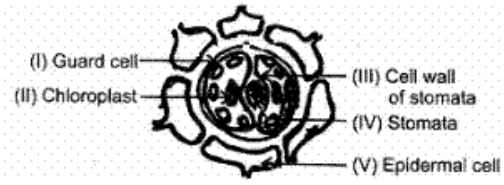
2. In human males, all the chromosomes are paired perfectly except one. This/these unpaired chromosome is/are **[1]**

   i. large chromosome
   ii. small chromosome
   iii. Y-chromosome
   iv. X-chromosome

   a) (i) and (ii) b) (iii) and (iv)

   c) (iii) only d) (ii) and (iv)

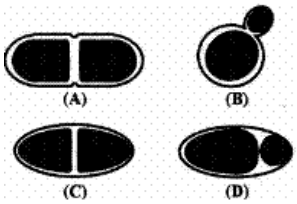
3. In the following diagram of the stomatal apparatus, which parts are incorrectly labelled ? **[1]**



   a) I and IV b) IV and V

   c) I and V d) II and III

4. The budding in Yeast is illustrated by the diagram: **[1]**



a) D
b) C
c) B
d) A

5. The relationship between biotic and abiotic environment is called: **[1]**

a) Biosphere
b) Community
c) Ecosystem
d) Atmosphere

6. Which of the following is incorrect about self-pollination: **[1]**

A. The genetic drifts of the breed can be removed
B. New varieties cannot be obtained by self-pollination
C. Repeated self-pollination leads to loss of vigour and vitality of species
D. It helps to preserve the parental characters

a) (B)
b) (A)
c) (C)
d) (D)

7. In plants the role of cytokinin is: **[1]**

a) Promote the opening of stomatal pore.
b) Help in the growth of stem.
c) Wilting of leaves.
d) Promote cell division.

8. **Assertion (A):** Each human trait is influenced by both paternal and maternal DNA. **[1]**
Reason (R): As compared to the father, the mother contributes more amount of genetic material to the child.

a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
b) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of the Assertion (A).
c) Assertion (A) is true, but Reason (R) is false.
d) Assertion (A) is false, but Reason (R) is true.

9. **Assertion (A):** Phototropism is a directional growth movement. **[1]**
Reason (R): It occurs in the direction of light.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

10. Give some methods that could be applied to reduce our intake of pesticides. **[2]**

11. **[2]**
i. Will the impact of removing all the organisms in a trophic level be different for different trophic levels?
ii. Can the organisms of any trophic level be removed without causing any damage to the ecosystem?

OR

What is the dam? Why do we seek to build large dams? While building large dams, which three main problems should particularly be addressed to maintain peace

among local people? Mention them.

12. Name the hormones secreted by the following endocrine glands and specify one function of each: **[2]**

a. Thyroid

b. Pituitary

c. Pancreas

13. What are Chromosomes? Explain how stability of the DNA of the species is ensured in sexually reproducing organisms. **[3]**

14. The digestion of food in human alimentary canal is a complex process. State the enzyme/salt present in the following and mention their function in the process of digestion: **[3]**

i. Saliva

ii. Bile Juice

iii. Pancreatic Juice

15. **Read the following text carefully and answer the questions that follow:** **[4]**

The green plants make their food, through photosynthesis and are therefore called autotrophs. All other organisms depend upon green plants for food and are referred to as heterotrophs. Green plants carry out photosynthesis by using light energy of sun. The first phase of reactions are directly light driven therefore called light reactions. The second phase of reactions are not directly light driven but are dependent on the products of light reactions and are called dark reactions.

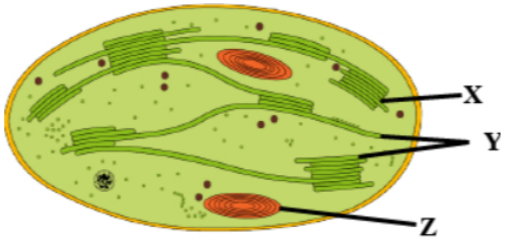
i. What is produced during the light phase of photosynthesis? (1)

ii. How many sugar molecules are produced in the overall process of photosynthesis? (1)

iii. A plant is provided with ideal conditions for photosynthesis and supplied with isotope $^{14}CO_2$. When the products of the process are analysed carefully, what would be the nature of products? (2)

OR

What are the accurate functions corresponding to parts X, Y, and Z as depicted in the provided diagrammatic representation of an electron micrograph of a section of a chloroplast? (2)



16. How is the sex of the child determined in human beings? **[5]**

OR

Compare nervous and hormonal mechanism for control.

Section B

17. Find the incorrect statement: **[1]**

A. The pH of the stomach is approximately 4.5
B. Plants grow well in natural soil
C. The pH of acid rain is nearly 5.6
D. The pH of rainwater is nearly 7

a) Statement (B)
b) Statement (D)
c) Statement (C)
d) Statement (A)

18. Which of the following is the incorrect method of preventing rusting? **[1]**

a) The machine parts should be oiled or greased
b) The iron articles should be painted
c) Galvanised iron pipes are used for water supply.
d) Iron articles should be covered with cotton

19. Which of the following statements are false about soaps and detergents? **[1]**

i. Soaps are water soluble while detergents are not.
ii. Soaps are non-biodegradable while detergents are biodegradable.
iii. Hardness of water is due to presence of Ca and Mg salts which form scum with soap.
iv. The polar group in soaps is -COONa.

a) (i), (ii) and (iv) only
b) (iii) and (iv) only
c) (i), (ii) and (iii) only
d) (i) and (ii) only

20. Match the following with the correct response: **[1]**

(i) The bond which holds cations and anions	(a) Ionic
(ii) Self linking property of carbon	(b) Pyridine
(iii) Denatured alcohol	(c) Catenation
(iv) Synthetic detergents	(d) Non-biodegradable

a) (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)
b) (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)
c) (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)
d) (i) - (c), (ii) - (b), (iii) - (d), (iv) - (a)

21. The most malleable metals are: **[1]**

a) Silver and gold
b) Iron and gold
c) Copper and silver
d) Gold and copper

22. The number of covalent bond(s) present in a nitrogen molecule is/are: (Atomic number of nitrogen is 7) **[1]**

a) 3
b) 5
c) 7
d) 1

23. Solid sodium bicarbonate was placed on a strip of pH paper. The colour of the strip **[1]**

a) turned light pink
b) did not change
c) turned green and suddenly yellow
d) turned blue

24. **Assertion (A):** Stannous chloride is a powerful oxidising agent which oxidises mercuric chloride to mercury. **[1]**

Reason (R): Stannous chloride gives a grey precipitate with mercuric chloride, but stannic chloride does not do so.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

25. A soil sample solution was analyzed with universal pH indicator paper and the colour of the paper turned yellowish. **[2]**

i. What is the nature of soil?

ii. What type of substance should the farmer add to the soil in order to get a suitable soil for farming?

26. Give an example of each of the following : **[3]**

i. A carbon compound containing two double bonds.

ii. A molecule in which central atom is linked to three other atoms.

iii. An organic compound which is soluble in water.

OR

Write the names and structural formulae of all the possible isomers of hexane.

27. Samples of four metals A, B, C and D were taken and added to the following solution one by one. The results obtained have been tabulated as follows: **[3]**

Metal	**Iron(II) sulphate**	**Copper(II) sulphate**	**Zinc sulphate**	**Silver nitrate**
A	No reaction	Displacement	—	—
B	Displacement	—	No reaction	—
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Use the table above to answer the following questions about metals A, B, C and D.

i. Which is the most reactive metal?

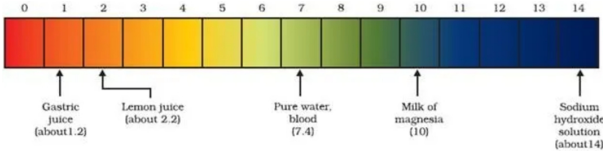
ii. What would you observe if B is added to a solution of copper(II) sulphate?

iii. Arrange the metals A, B, C and D in the order of decreasing reactivity.

28. **Read the following text carefully and answer the questions that follow:** **[4]**

The strength of acid and base depends on the number of H^+ and the number of OH^- respectively. If we take hydrochloric acid and acetic acid of the same concentration, say one molar, then these produce different amounts of hydrogen ions. Acids that give rise to more H^+ ions are said to be strong acids, and acids that give less H^+ ions are

said to be weak acids. Can you now say what weak and strong bases are?



i. Fresh milk has a pH of 6. How do you think the pH will change as it turns into curd? (1)

ii. Is Gastric juice a weak acid? (1)

iii. Milk of magnesia is an acid or base? For what purpose it can be used? (2)

OR

What is the pH value of saliva after the meal? (2)

29. i. Identify the type of reactions taking place in each of the following cases and write the balanced chemical equations for the reactions **[5]**

a. Barium chloride solution is mixed, with copper sulphate solution and a white precipitate is obtained.

b. On heating copper powder in air, the surface of the copper powder turns black.

ii. What happens when hydrogen gas is passed over the heated copper oxide? Write the chemical equation involved in this reaction.

OR

A cloth strip dipped in onion juice is used for testing a liquid X. The liquid X changes its odour. Which type of an indicator is onion juice? The liquid X turns blue litmus red. List the observations the liquid X will show on reacting with the following:

i. Zinc granules

ii. Solid sodium carbonate

Write the chemical equations for the reactions involved.

Section C

30. Find the incorrect statement: **[1]**

A. The direction of flow of negative charge was taken to be the direction of the electric current.

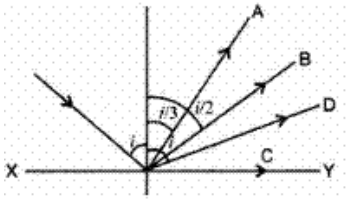
B. The P. D. for all the resistors in the parallel circuit remains constant.

C. The SI unit of electric charge is the coulomb.

a) B and C b) (A)

c) (C) d) (B)

31. On regular reflection from the surface XY, the reflected ray will go along: **[1]**



a) B b) D

c) A d) C

32. **Assertion (A):** Red light signals are used to stop the vehicles on the road. **[1]**

Reason (R): Red coloured light is scattered the most so as to be visible from a large distance.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

33. What is the function of an earth wire? Why is it necessary to earth metallic appliances? **[2]**

34. Several electric bulbs designed to be used on a 220V electric supply line are rated 10W. How many lamps can be connected in parallel with each other across the two wires of 220V line if the maximum allowable current is 5A? **[2]**

OR

The values of the current I flowing in a given resistor for corresponding values of potential difference V across the resistor are given below:

I (amperes)	0.5	1.0	2.0	3.0	4.0
V (volts)	1.6	3.4	6.7	10.2	13.2

Plot a graph between V and I and calculate the resistance of that resistor.

35. A doctor has prescribed a corrective lens of power +1.5 D. Find the focal length of the lens. Is the prescribed lens diverging or converging? **[3]**

36. Why do we observe difference in colours of the Sun during sunrise, sunset and noon? **[3]**

37. i. What should be the position of the object when a concave mirror is to be used **[3]**

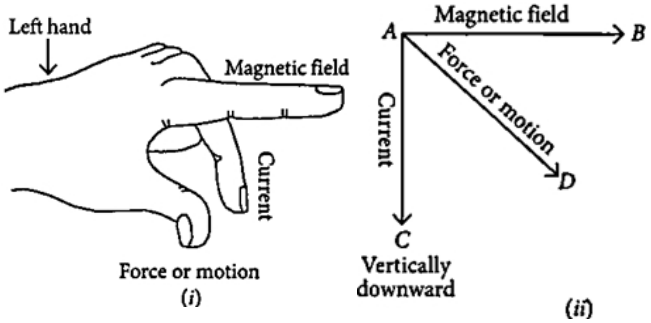
a. as a shaving mirror and

b. in torches producing parallel beam of light?

ii. A man standing in front of a mirror, finds his image having a very small head and legs of normal size. What type of mirrors are used in designing such a mirror?

38. **Read the following text carefully and answer the questions that follow:** **[4]**

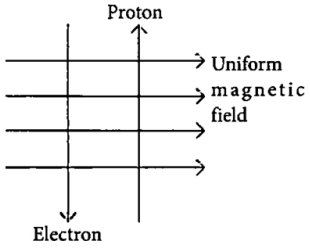
Andre Marie Ampere suggested that a magnet must exert an equal and opposite force on a current-carrying conductor, which was experimentally found to be true. But we know that current is due to charges in motion. Thus, it is clear that a charge moving in a magnetic field experience a force, except when it is moving in a direction parallel to it. If the direction of motion is perpendicular to the direction of magnetic field, the magnitude of force experienced depends on the charge, velocity (v), strength of magnetic field (B), and sine of the angle between v and B. Direction of magnetic force is given by Fleming's left-hand rule.



i. If an electron is travelling horizontally towards east. A magnetic field in vertically downward direction exerts a force on the electron along which direction? (1)

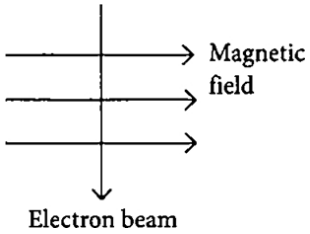
ii. A charged particle is moving with velocity v in a magnetic field of induction B. The force on the particle will be maximum when (1)

iii. A uniform magnetic field exists in the plane of paper pointing from left to right as shown in figure. In the field, an electron and a proton move as shown. Where do the electron and the proton experience the force? (2)



OR

An electron beam enters a magnetic field at right angles to it as shown in the figure. What would be the direction of force acting on the electron beam? (2)



39. What is meant by resistance of a conductor? Name and define its SI unit. List the factors on Which the resistance of a wire affected, if (i) its length is doubled, (ii) its radius is doubled? **[5]**

OR

i. What is meant by resistance of a conductor? Define its SI unit.

ii. List two factors on which the resistance of a rectangular conductor depends.

iii. How will the resistance of a wire be affected if its

I. length is doubled, and

II. radius is also doubled?

Give justification for your answer.

Solution

Section A

1.

(d) Megaspore

Explanation:

Megaspore is a haploid cell that is formed by meiosis in the megaspore mother cell. It is the first cell of female gametophyte.

2.

(b) (iii) and (iv)

Explanation:

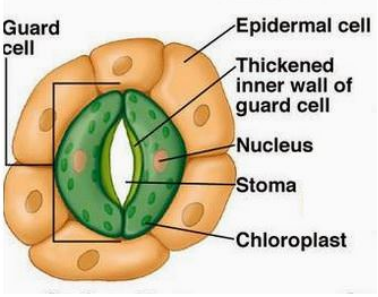
Males have two distinct sex chromosomes (XY) and are called the heterogametic sex (Chromosome-23). Females have two of the same kind of sex chromosome (XX)(Chromosome-23) and are called the homogametic sex. In human males, all the chromosomes (22- Autosomes) are paired perfectly except one (23rd). These unpaired chromosomes are X and Y (Chromosome-23).

3.

(d) II and III

Explanation:

Except these parts, other labeling are correct.



4.

(c) B

Explanation:

The bud in the yeast appears as a protuberance.

5.

(c) Ecosystem

Explanation:

All the interacting organisms of an area together with the non-living constituents form an ecosystem. An ecosystem consists of biotic components comprising living organisms, as well as abiotic components comprising physical factors like rainfall, wind, soil, and minerals.

6.

(b) (A)

Explanation:

Genetic drift cannot be removed by self pollination.

7.

(d) Promote cell division.

Explanation:
In plant cells, cytokinins encourage cell division, Plant roots and shoots contain it.

8.

(c) Assertion (A) is true, but Reason (R) is false.
Explanation:
Explanation

- **Assertion (A) is true**
  Each human trait is influenced by **both paternal and maternal DNA**, since an individual inherits **half of their nuclear genetic material from the father and half from the mother**.
- **Reason (R) is false**
  The mother does **not** contribute more genetic material than the father. Both parents contribute **equal amounts of nuclear DNA** (23 chromosomes each).
  (Although mitochondria are inherited from the mother, this does not mean she contributes more genetic material overall.)

9. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation:
Phototropism is the movement or bending of light towards light. Hence, it is known as the directional growth movement.

10. Following methods could be applied to reduce the intake of pesticides:
    i. Minimise the use of pesticides, and use other methods to control pests
    ii. Consuming washed fruits and vegetables which will wash away the harmful pesticides
    iii. Developing vegetarian feeding habits as biological magnification of a harmful chemical increases with increasing trophic level.(i.e. feed upon plants as plants belong to lower trophic level so, they have less accumulation of insecticides, whereas organisms of higher trophic level have higher concentration of insecticides and pesticides).

11. i. Yes, the impact of removing all the organisms in a trophic level will be different for different trophic levels. The lower trophic level of an ecosystem has a greater number of individuals then the higher trophic levels. Removal of producers will affect all the organisms of successive trophic levels and it will threat their survival. The removal of higher trophic levels will lead to an increase in organisms of lower tophic level and the organisms of a higher trophic level will die due to the shortage of food.
    ii. No, the removal of all organisms of a trophic level will disturb the ecosystem. The killing of higher trophic level organisms will cause an explosion in the population of lower-level organisms. This will adversely affect the ecosystem.

OR

The dam is a barrier that is built across a river or a stream for storage of water.
We seek to build large dams because it can ensure the storage of an adequate amount of water for irrigation and also for generating electricity.
The three main problems are an economical problem, environmental problem, and ecosystem problem.

12. a. Thyroid excretes Thyroxine hormone. It regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth.
    b. Pituitary excretes Growth hormone. It regulates growth and development of the body.
    c. Pancreas excretes Insulin hormone. It regulates blood sugar level.

13. Chromosomes are a collection of thread-like structures that come in a variety of lengths and forms.
Traits that are passed down from parents to children across several generations are encoded in DNA. DNA copying is the method that keeps DNA stable in sexually reproducing organisms. The highly effective and error-free DNA replication procedure protects the DNA's stability. The

process of meiosis during gamete synthesis ensures that the chromosome number is always maintained during reproduction.

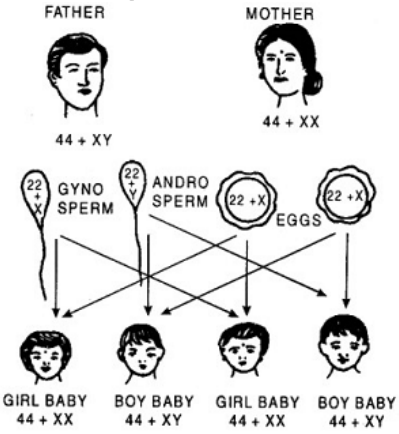
14. i. **Salivary amylase -** converts Starch to sugar
    ii. **Bile salts -** changing the acidic food alkaline/emulsifies fats.
    iii. **Trypsin -** Helps in digestion of proteins/Lipase - Breaking down emulsified fats

15. i. In light reaction of photosynthesis assimilatory power is produced, i.e., energy rich ATP molecules and reduced coenzyme NADPH.
    ii. The equation of photosynthesis may be represented as
    $6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$
    No. of $C_6H_{12}O_6$ (sugar) molecules produced = 1
    iii. In the process of photosynthesis, Plants manufacture glucose from H_2O and CO_2 and oxygen gas is released .So, due to the isotopic carbon of CO_2 ,only glucose will be labelled,but oxygen will be normal.

    OR

    X - Light reaction, Y - Carbohydrate synthesis, Z - Carbohydrate storage
    Light reactions (or photochemical phase) of photosynthesis mainly occur on the grana thylakoids. Dark reactions (or biosynthetic phase) which involve the synthesis of carbohydrates by CO_2 fixation, occur in the stroma (or matrix) of chloroplasts. The chloroplast matrix of higher plants stores starch temporarily in the form of starch granules.

16. Determination of the sex of child. Sex chromosomes determine sex in human beings. In males, there are 44 + XY chromosomes, whereas, in female there are 44 + XX chromosomes. Here X and Y chromosomes determine sex in human beings.
    Two types of gametes are formed in male, one type is having 50%, X-chromosome, whereas, other type is having Y-chromosome. In female, gametes are of one type and contain X-chromosome.
    The females are homogametic. If male gamete having Y-chromosome (endosperm) undergoes fusion with female gamete having X-chromosome the zygote will have X Y chromosomes and this gives rise to male child.



    If male gamete having X-chromosome undergoes fusion with female gamete having X-chromosome, the zygote will be having XX-chromosome and this gives rise to female child.

OR

Nervous System	Hormonal System
Made of neuron	Made of Hormone
Messages transmitted in the form of electrical impulses	Message transmitted in the form of chemicals called hormones.
Messages transmitted along nerve fibres.	Messages transmitted through blood stream.
Messages travel very quickly.	Messages travel very slowly.
Effect of message usually lasts for a very short while	Effect of message usually lasts longer
Sense organs are receptors as nerve cells	Glands are effectors which secrete hormones

located in them receive information.	when the brain commands.

Section B

17.

(d) Statement (A)

Explanation:

The human stomach produces gastric juices which contain hydrochloric acid in them resulting in a pH of 1.4.

18.

(d) Iron articles should be covered with cotton

Explanation:

The most common method of preventing the rusting of iron is to coat its surface with paint or apply grease, oil or varnish. Rusting of iron can be prevented by galvanization. The process of depositing a thin layer of Zinc metal on Iron objects is called galvanization. Iron articles should be covered with plastic is the incorrect method of preventing rusting.

19.

(d) (i) and (ii) only

Explanation:

Soaps and detergents are water soluble. Soaps are biodegradable while, detergents are not.

20. **(a)** (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)

Explanation:

- Ionic bonds are formed between cations and anions.
- Catenation is the linkage of atoms of the same element into longer chains. Catenation occurs most readily in carbon.
- Pyridine is added to alcohol to make it unsuitable for drinking.
- Most of the synthetic detergents are non-biodegradable. They cannot be decomposed by micro-organisms like bacteria.

21. **(a)** Silver and gold

Explanation:

Silver & Gold

22. **(a)** 3

Explanation:

3

23.

(b) did not change

Explanation:

Solid $NaHCO_3$ does not change pH paper. It changes only in aqueous solution.

24.

(d) A is false but R is true.

Explanation:

A is false but R is true.

25. i. As the soil solution turned universal indicator paper yellow, it indicates that the soil solution is acidic and contains a higher H^+ ion concentration.

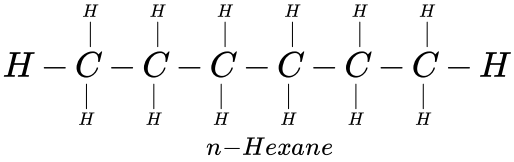
ii. The farmer should add some basic additives to soil such as slaked lime (calcium hydroxide) or quick lime (calcium oxide) to enhance the productivity of the soil.

26. i. Carbon dioxide

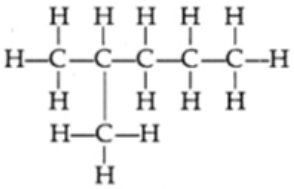
ii. Ammonia
iii. Ammonium chloride

OR

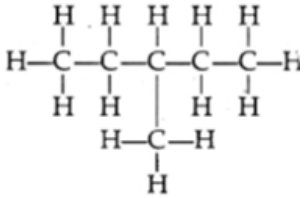
A possible isomer of hexane



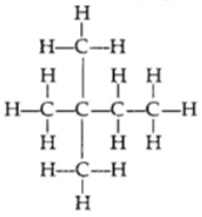
$n-Hexane$



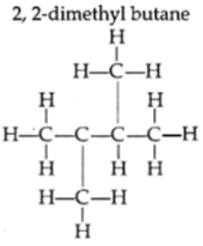
2-methyl pentane



3-methyl pentane



2, 2-dimethyl butane



2, 3--methyl pentane

27. i. B is most reactive as it displaces all other metals from their respective salt solutions.
ii. B will displace copper from copper(II) sulphate, being a more reactive metal than it.
iii. B > A > C > D.

28. i. The pH of milk is 6. As it changes to curd, the pH will reduce because curd is acidic in nature. The acids present in it decrease the pH.
ii. No, gastric juice is a strong acid.
iii. Milk of magnesia is a base and it can be used as an antacid.
OR
The pH value of saliva after the meal is 5.8.

29. i. a. $BaCl_2$ (aq) + $CuSO_4$ (aq) $\rightarrow$ $BaSO_4$ (s) + $CuCl_2$ (aq)
Double decomposition reaction
b. $2Cu(s) + O_2(g) \xrightarrow{Heat} 2CuO(l)$
Redox reaction, here Cu is changing into CuO. This is oxidised and oxygen is getting reduced by adding metal to it.
ii. If hydrogen gas is passed over heated material (CuO) the black coating on the surface turns brown as the reaction takes place and copper is obtained. $\underset{Black}{CuO(s)} + H_2 \xrightarrow{Heat} \underset{(Brown)}{Cu(s)} + H_2O$

OR

Liquid 'X' changes its odour when dipped in onion juice:

- Since in the above question, they have provided the data that the liquid 'X' changes its odour when a cloth strip is dipped in onion juice, this means that the change in the odour represents the acidic nature of the substance.
- Also, since the liquid 'X' turns blue litmus to red, the liquid can be defined as acid as the acids tend to change the blue colour of litmus to red.

Onion juice as an indicator:

- Here onion juice which is acting as an indicator to change the colour of the liquid 'X when dipped in it.
- The given indicator is also known as an **olfactory indicator.**

i. **The reaction of the liquid X with Zinc granules:**

- We know, that when this acid reacts with metal, it produces salt with the evolution of hydrogen gas.
- Here, the zinc granules which act as a metal react with the acid (liquid 'X) and produce salt and hydrogen gas.
- The general form of the given reaction can be shown as:
  $Acid(X) + Zn(s) \rightarrow Zn\ Salt\ (s) + H_2(g)$

ii. **The reaction of the liquid X with Solid sodium carbonate:**

- When the liquid 'X' which acts as an acid undergoes a reaction with the solid sodium carbonate it produces sodium salt and water along with the release of carbon dioxide gas.
- The general form of the given reaction can be shown as:
  $Acid(X) + Na_2CO_3\ (s) \rightarrow Na\ Salt + H_2O(l) + CO_2(g)$

Section C

30.

(b) (A)

Explanation:

As a convention, the direction of flow of positive charge was taken to be the direction of electric current. The direction of flow of electrons is opposite to the direction of conventional current.

31.

(b) D

Explanation:

On regular reflection $\angle r = \angle i$.

32.

(c) A is true but R is false.

Explanation:

A is true but R is false.

Red light scattered the least.

33. Earth wire is used as a safety measure especially for electric appliances having a metallic body. The metallic body of appliances like electric press, fans, toaster, refrigerators, etc are connected to earth wire which provides an easy path for current to go to the earth in case live wire touches the body of appliance incidentally. The user will not suffer a severe electric shock even of touching a defective appliance.

34. Let current through each bulb be I.

$P = VI,\ 10 = 220\ I$

$I = \frac{1}{22} A$

Let n such bulbs be connected in series.
Current through n bulbs = 5A
n (current in 1 bult) = 5
$n\frac{1}{22} = 5$
n = 110
110 such bulbs can be lighted within allowable limit of 5A.

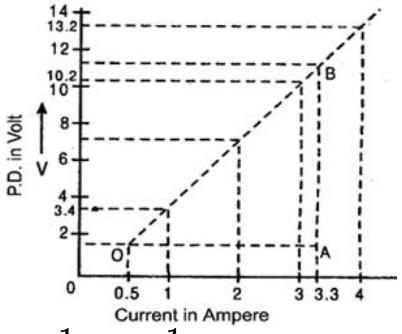
OR

Graph between I and V is as shown in figure. Since graph is almost a straight line, the slope of line between any two points give the resistance. Slope of say OB is:

$R = \frac{AB}{OA} = \frac{BC-AC}{DA-OD}$

$\frac{AB}{OA} = \frac{12-1.6}{3.3-0.5} = \frac{10.4}{2.8} = \frac{104}{28}$

$R = 3.7O$



35. $f = \frac{1}{P} = \frac{1}{1.5} = 0.67\ m$
f = 0.67 m
Lens is converging.
36. This is because of scattering of light near the horizon, most of the blue light and shorter wavelengths are scattered away by the particles present in the atmosphere during sunrise and sunset. So, the light that reaches our eyes is of longer wavelength (e.g. red). This gives rise to the reddish appearance of the sky. But during the day sun appears white as sun is near the surface of earth nearly overhead, thus the sunlight passes through much smaller distance and thus the scattering is much less and sun appears white.
37. i. a. Object should be between pole and focus.
b. At the focus.
ii. a. Small head-convex mirror.
b. Legs of normal size-plane mirror.
38. i. Fleming's left-hand rule is used to determine the direction of force on electron i.e., in south direction.
ii. Force = q (V × B) = qVB sin0
Where, 0 is angle between velocity and magnetic field.
So, sin0 is maximum when 0 is 90^0
or velocity is perpendicular to magnetic field.
iii. As the direction of current is taken opposite to the direction of motion of electrons, therefore, current from the motion of electron and proton is in the same direction, i.e., from bottom to top. Now, according to Fleming's left-hand rule, the electron and the proton experience forces both pointing into the plane of paper.
OR
We know that both the directions are perpendicular, thus for force direction = ?
Using Fleming's left-hand rule,
Direction of force is perpendicular to the direction of magnetic field and current.
Thus direction of force is opposite to electron motion into the page at 90°
39. Property to oppose the flow of electric current is called resistance. Its SI unit is ohms. If 1V potential difference is there and 1A current is flowing then it is said that there is 1 ohm

resistance.

i. $\therefore R = \frac{\rho l}{A}\begin{bmatrix} where,\ l\ =\ length\, of\, wire, \\ A\ area\, of\, cross-\sec tion\, of\, wire \end{bmatrix}$

$R' = \frac{\rho l \times 2}{A}$

$\because R' = 2R$

i.e. resistance will be doubled, if length of the wire is doubled.

ii. $\therefore\ R = \frac{\rho l}{A} \Rightarrow R = \frac{\rho l}{\pi r^2}\ \left[\because A = \pi r^2\right]$

$R' = \frac{\rho l}{\pi(2r)^2} = \frac{\rho l}{\pi r^2} \times \frac{1}{4} = \frac{R}{4}$

Thus, resistance will decrease by four times, if radius of wire is doubled.

OR

i. Resistance is the quality of a conductor that causes it to resist the flow of an electric current through it. It is the proportion of the potential difference between ends to the current flowing. The SI unit is ohm (Ω).

ii. Two factors on which the resistance of a rectangular conductor depends are:

I. Length of conductor

II. Area if cross-section

iii. I. $\mathrm{R} = \frac{\rho \mathrm{l}}{\mathrm{A}}$

Where, ρ = electrical resistivity

l = length of the conductor

A = cross-sectional area of the conductor

Hence, if the length is double then

$\Rightarrow \mathrm{R}_1 = \rho\frac{(2|)}{\mathrm{A}}$

$\therefore \mathrm{R}_1$ = 2(R)

So, if the length of the resistance gets doubled then resistance also gets doubled.

II. Now, when the radius is double then

$\Rightarrow \mathrm{R}_2 = \frac{\rho \mathrm{l}}{\mathrm{A}}$

$\Rightarrow \mathrm{R}_2 = \frac{\rho l}{\pi(2\mathrm{r})^2}$

$\therefore \mathrm{R}_2 = \frac{1}{4}$ (R)

So, if the radius gets doubled then resistance will be $\left(\frac{1}{4}\right)^{\text{th}}$ of initial resistance.