Class X Session 2024-25
Subject - Science
Sample Question Paper - 8

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

General Instructions:

1. This question paper consists of 39 questions in 5 sections.

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.

3. Section A consists of 20 objective-type questions carrying 1 mark each.

4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.

5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.

6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.

7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

1. Four test tubes containing solutions (I), (II), (III) and (IV) are shown below along with their colours. Zinc sulphate is contained in **[1]**

(I) Green   (II) Yellow   (III) Blue   (IV) Colourless
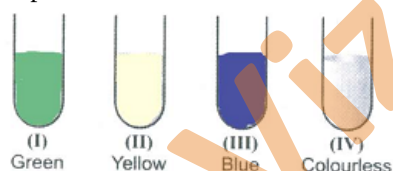
    a) II   b) IV

    c) I   d) III

2. Choose a displacement reaction: **[1]**

    a) Burning of metals   b) Addition of more active metal to a solution of a less active metal compound.

    c) Extraction of metals   d) Electrolysis

3. The compounds used to prepare $NaHCO_3$ are: **[1]**

    a) Na_2CO_3, CO_2, H_2O, O_2 b) $NaCl$, NH_3, CO_2, H_2O

    c) $NaCl$, $NaOH$, CO_2, H_2O d) $NaCl$, $Ca(OH)_2$, H_2O, CO_2
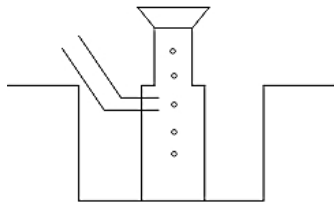
4. The hardness of water is caused by: **[1]**

a) All of these
b) $Mg(HCO_3)_2$

c) $CaCl_2$
d) $CaSO_4$

5. A metal is heated with dil H_2SO_4. The gas evolved is collected by the method shown in the figure. Answer the following questions based on it: **[1]**

The gas _____ than air and it is _____ in water.

a) heavier, insoluble
b) lighter, soluble

c) heavier, soluble
d) lighter, insoluble

6. Among the following, the metal with lowest density is: **[1]**

a) Lead
b) Magnesium

c) Aluminium
d) Lithium

7. The total number of electrons shared in the formation of an ethyne molecule is: **[1]**

a) 10
b) 4

c) 3
d) 6

8. The process common to aerobic and anaerobic respiration is **[1]**

a) Glycolysis
b) Electron transport chain

c) Kreb's cycle
d) Oxidation

9. Father of Human genetics is **[1]**

a) H.G Khurana
b) Sir Archibald Garrod

c) Gregor Mendel
d) Charles Darwin

10. In a flower, the parts that produce male and female gametes (germ cells) are **[1]**

a) stamen and style
b) filament and stigma

c) anther and ovary
d) stamen and anther

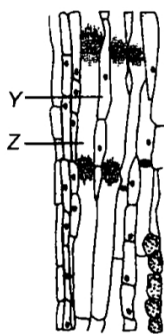11. Alternative forms of a gene are called **[1]**

a) Chromosomes
b) Multiples

c) Loci
d) Alleles

12. Refer to the following figure of phloem tissue. Which of the following statements correctly describes the relationship between cells Y and Z? **[1]**

a) Y contains ribosomes that synthesise proteins required by Z.

b) Y provides the carbohydrates that are transported by Z.

c) Y transports sucrose, while Z transports water and minerals.

d) Y helps to filter the liquid transported in Z to facilitate translocation.

13. The process of inducing a current in a coil of wire by placing it in a region of changing magnetic field is: **[1]**

a) Electrical effect

b) Magnetic effect of current

c) Electromagnetic induction

d) Heating effect of current

14. Match the column I with column II and select the correct option from the codes given. **[1]**

Column I	Column II
(a) Electric current	(i) volt
(b) emf	(ii) ohm
(c) Resistance	(iii) ohm-metre
(d) Resistivity	(iv) ampere

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

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

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

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

15. A system of inter-dependent food chains represents **[1]**

a) Ecosystem

b) Community

c) Trophic levels

d) Food web

16. In the following groups of materials, which group contains only non-biodegradable materials? **[1]**

a) Polythene, Detergent, PVC

b) Wood, Paper, Leather

c) Plastic, Detergent, Grass

d) Plastic, Bakelite, Cloth

17. **Assertion (A):** Sodium metal is stored under Kerosene. **[1]**

Reason (R): Metallic sodium melts when exposed to air.

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.

18. **Assertion (A):** Asexual reproduction is a primitive type of reproduction. **[1]**

Reason (R): Asexual reproduction involves only mitotic cell division.

a) Both A and R are true and R is the correct

b) Both A and R are true but R is not the

explanation of A.   correct explanation of A.

    c) A is true but R is false.   d) A is false but R is true.

19.   **Assertion (A):** Force experienced by moving charge will be maximum if direction of velocity of charge is **[1]** perpendicular to applied magnetic field.

    Reason (R): Force on moving charge is independent of direction of the applied magnetic field.

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

    c) A is true but R is false.   d) A is false but R is true.

20.   **Assertion (A):** Ecology is study of relationship between living organisms and their environment. **[1]**

    Reason (R): The biotic community and non-living environment of an area function together to form an ecosystem.

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

    c) A is true but R is false.   d) A is false but R is true.

Section B

21.   Classify the following compounds as alkanes, alkenes and alkynes: C_2H_4, C_3H_4, C_4H_8, C_5H_{12}, C_5H_8, C_3H_8, **[2]** C_6H_6

22.   Why cannot fertilisation take place in flowers if pollination does not occur? **[2]**

23.   What happens to glucose which enters the nephron along with the filtrate? **[2]**

<div align="center">OR</div>

Explain the role of liver in excretion.

24.   If the image formed by a lens for all positions of an object placed in front of it is always erect and diminished, **[2]** what is the nature of this lens? Draw a ray diagram to justify your answer.

25.   Complete the below diagram by filling spaces marked as A, B, C and D: **[2]**
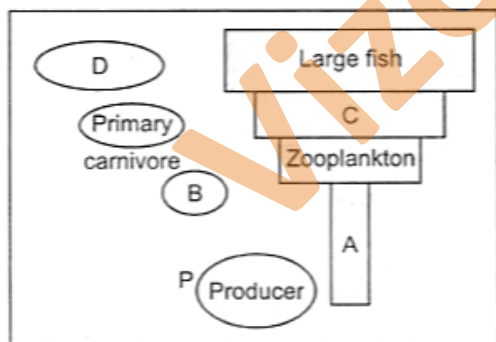
<div align="center">OR</div>

Consider the following food chains-

  a. Plants → Mice → Snakes → Hawks

  b. Plants → Mice → Hawks

If energy available at the producer level in both the food chains is 100J. In which case will hawks get more energy and how much & Why?

26.   List two main causes of a person developing near sightedness. Show with the help of a ray diagram how this **[2]** defect can be corrected.

Section C

27. State three reasons for the following facts: **[3]**

    i. Sulphur is a non-metal.

    ii. Magnesium is a metal.

One of the reasons must be supported with a chemical equation.

28.   i. Define non-metals. Give five examples of non-metals. **[3]**

  ii. Name a non-metal which conducts electricity.

  iii. Name a non-metal having lustre (shining surface).

  iv. Name a non-metal which is extremely hard.

  v. How do non-metals react with oxygen? Explain with an example. Give equation of the reaction involved. What is the nature of the product formed? How will you demonstrate it?

<div align="center">OR</div>

  i. Write the electron-dot structures for sodium, oxygen and magnesium.

  ii. Show the formation of Na_2O and MgO by the transfer of electrons.

  iii. What are the ions present in these compounds?

29.   i. Why is nutrition a necessity for an organism? State three reasons. **[3]**

  ii. What is likely to happen if green plants disappear from Earth?

30. Explain Mendel's observation when he crossed a homozygous tall (TT) plant with homozygous dwarf (tt) plant followed by self-cross. **[3]**

31. The refractive indices 1.0003, 1.31 1.5 respectively of Air, Ice and Benzine in which of these does the light travels fastest? **[3]**

32.   i. A wire of resistance 2 has been connected to a source of 50 V as its two ends. What is the current flowing through the wire? **[3]**

  ii. An electric refrigerator rated 400 W operates 8 hour/day. What is the cost of the energy to operate it for 30 days at ₹ 3.00 per kWh?

33. A household uses the following electric appliances: **[3]**

  i. The refrigerator of rating 400 W for 10 h each day and Two electric fans of rating 80 W each for 6 h daily.

  ii. Six electric tubes of rating 18 W each for 6 h daily.

Calculate the electricity bill for the household for the month of June, if the cost of electrical energy is Rs 3 per unit.

<div align="center">**Section D**</div>

34. Esters are sweet-smelling substances and are used in making perfumes. Suggest some activity and the reaction involved for the preparation of an ester with a well-labeled diagram. **[5]**

<div align="center">OR</div>

Define structural isomer and draw the isomeric structures of butane. Compare the structure of benzene and cyclohexane by drawing them.

35. With the help of suitable diagrams explain the various steps of budding in Hydra. **[5]**

Budding in Hydra
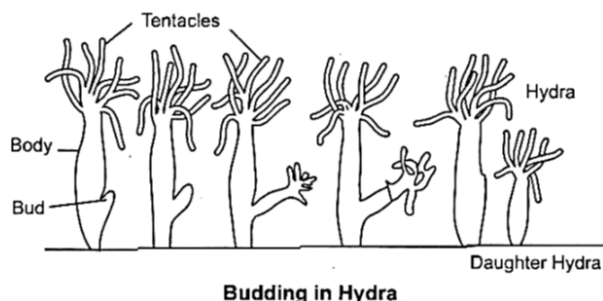
OR

Why do we call pituitary gland as the master gland? Where is it located and what are its functions?

36. i. Draw a labelled ray diagram to show the path of a ray of light incident obliquely on one face of a glass slab. **[5]**

ii. Calculate the refractive index of the material of a glass slab. Given that the speed of light through the glass slab is 2×10^8 m/s and in air is 3×10^8 m/s.

iii. Calculate the focal length of a lens, if its power is - 2.5 D.

OR

a. Draw a ray diagram for showing the convergence of a parallel beam of light by a concave mirror and mark the positions of pole and the centre of curvature in it.

b. An object 4 cm in size is placed at 25 cm in front of a concave mirror of focal length 15 cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image? Find the nature and size of the image.

c. List any two uses of a concave mirror.

Section E

37. **Read the text carefully and answer the questions:** **[4]**

Salt of a strong acid and strong base is neutral with a pH value of 7. NaCl common salt is formed by a combination of hydrochloride and sodium hydroxide solution. This is the salt that is used in food. Some salt is called rock salt, bed of rock salt was formed when seas of bygone ages dried up. The common salt thus obtained is an important raw material for various materials of daily use, such as sodium hydroxide, baking soda, washing soda, and bleaching powder.

(a) If given acids are phosphoric acid, carbonic acid, hydrochloric acid and sulphuric acid, then which acid does not form an acidic salt?

(b) What is the formula of baking soda?

OR

Name the substance which on treatment with chlorine to obtain bleaching powder.

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

Following questions are based on the two tables given below. Study these tables related to blood sugar levels:

Table A (Blood glucose chart)

	Mean Blood Glucose Level (mg/dL)
Doctor's advice needed	380
	350
	315
	280
	250
	215

Good	180
	150
Excellent	115
	80
	50

Table B (Blood Report of Patient X and Y)

Time of check	Blood Glucose ranges (mg/dL)	
	Patient X	Patient Y
Before breakfast (Fasting)	<100	70-130
Before lunch, supper and snack	<110	70-130
Two hours after meals	<140	<180
Bedtime	<120	90-15

(a) Refer to Table B showing the blood report of the levels of glucose of patients X and Y. Infer the disease which can be diagnosed from the given data.

(b) Identify the hormone whose level in the blood is responsible for the above disease.

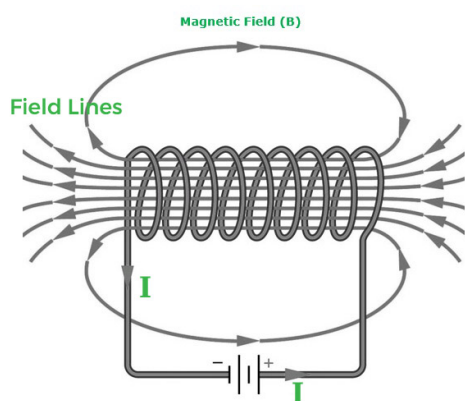(c) High/low sugar and a low/high-fat diet What would you recommend to the affected patient?

OR

Refer to Table A and suggest the value of the mean blood glucose level beyond which doctor's advice is necessary.

39. **Read the text carefully and answer the questions:** [4]

An insulated copper wire wound on a cylindrical cardboard tube such that its length is greater than its diameter is called a solenoid. When an electric current is passed through the solenoid, it produces a magnetic field around it. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. The field lines inside the solenoid are in the form of parallel straight lines. The strong magnetic field produced inside a current-carrying solenoid can be used to magnetize a piece of a magnetic material like soft iron when placed inside the solenoid. The strength of the magnetic field produced by a current-carrying solenoid is directly proportional to the number of turns and strength of the current in the solenoid.

(a) What would be the strength of the magnetic field inside a long current-carrying straight solenoid?

(b) Which end is north and which end is south pole when current flows through a solenoid?

(c) A long solenoid carrying a current produces a magnetic field B along its axis. If the current is double and

the number of turns per cm is halved, then what will be the new value of the magnetic field?

OR

A soft iron bar is enclosed by a coil of insulated copper wire as shown in the figure. When the plug of the key is closed, then where would the face B of the iron bar be marked?
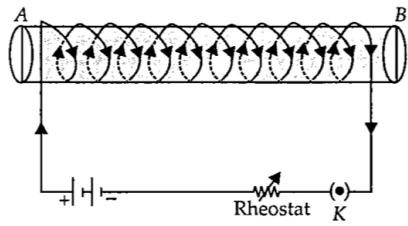
Solution

Section A

1.

   (b) IV

   Explanation: $ZnSO_4$ solution is colourless. It is contained in IV.

2.

   (b) Addition of more active metal to a solution of a less active metal compound.

   Explanation: Reactions in which atoms or ions move from one compound to others to form a new compound are known as Displacement reactions.

   A general displacement reaction can be represented using a chemical equation as follows:

   $A + BC \rightarrow AC + B$

   Displacement reaction takes place only when 'A' is more reactive than B. If 'B' is more reactive than 'A', then 'A' will not displace 'C' from 'BC' and reaction will not be taken place.

   Example: When zinc reacts with hydrochloric acid, it gives hydrogen gas and zinc chloride.

3. **(a)** Na_2CO_3, CO_2, H_2O, O_2

   Explanation: The reaction between sodium carbonate (Na_2CO_3) and carbon dioxide (CO_2) in the presence of water. Here's the balanced chemical equation for this reaction:

   $Na_2CO_3 + CO_2 + H_2O \rightarrow 2NaHCO_3$

4. **(a)** All of these

   Explanation: The **hardness of water** is caused by magnesium and calcium salts. Calcium and magnesium dissolved in water are the two most common minerals that make water hard. Temporary hardness is a type of water hardness caused by the presence of dissolved bicarbonate minerals (calcium bicarbonate and magnesium bicarbonate).

5.

   (d) lighter, insoluble

   Explanation:

   1. Since the gas is collected over water so it is insoluble.
   2. The gas evolved is lighter than air.

6.

   (d) Lithium

   Explanation: Lithium has lowest density.

7. **(a)** 10

   Explanation: Total number of electrons shared are 10.

8. **(a)** Glycolysis

   Explanation: Aerobic respiration has glycolysis continued with the Krebs cycle. In anaerobic respiration, glycolysis ends with lactic acid in humans. Fermentation only has glycolysis with the end product being fermented and transform into acetic acid.

9.

   (c) Gregor Mendel

   Explanation: Gregor John Mendel is considered as the father of genetics as he laid down the principles or laws of inheritance for the first time. Though his works were based on plants but the laws governing inheritance patterns are also applicable to humans and hence we call them as " Mendel's Laws of Inheritance".

10.

(c) anther and ovary

Explanation:

- The anther is part of the stamen (male sex organ) that produce pollen (male gamete).
- The ovary is an inferior part of the pistil (female sex organ) which contains ovule. Female gametophyte develops in the ovule.

11.

(d) Alleles

Explanation: An alternative form of a gene is known as an allele. Alleles vary in their sequence which may or may not result in a variant phenotype of a particular trait. Alleles represent variations of a gene that is responsible for a particular trait.

12. **(a)** Ycontains ribosomes that synthesise proteins required by Z.

Explanation: In the given figure of phloem tissue. Cell Y is companion cell while Z is sieve tube. Sieve tube lacks cellular organelles, e.g., nucleus, ribosomes, etc. Hence, the adjacent companion cells provide proteins, ATP and other molecules to carry out all the cellular functions in sieve tube cells.

13.

(c) Electromagnetic induction

Explanation: Electromagnetic induction

14.

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

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

15.

(d) Food web

Explanation: Food web

16. **(a)** Polythene, Detergent, PVC

Explanation: Substances that are not broken down into simpler substances by biological processes are said to be non-biodegradable. Polythene, detergents, and PVC (Polyvinylchloride) are non-biodegradable substances. Substances that can be broken down by biological processes are said to be biodegradable. Paper, wood, grass, leather, and cloth are biodegradable.

17.

(c) A is true but R is false.

Explanation: A is true but R is false.

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

Explanation: Both A and R are true and R is the correct explanation of A.

19.

(c) A is true but R is false.

Explanation: From equation $F = qvB \sin\theta$

Force on moving charge will be maximum if the direction of the velocity of charge is perpendicular to direction of magnetic field (when $\theta = 90^\circ$)

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

Explanation: Both A and R are true and R is the correct explanation of A.

Section B

21. Alkanes: C_5H_{12}, C_3H_8

Alkenes: C_2H_4, C_4H_8

Alkynes: C_3H_4, C_5H_8

22. In a flower fertilisation requires both male and female gametes. If pollination does not occur, male gamete is not available hence fertilisation cannot take place.

23. Glucose along with filtrate runs down through the long renal tubule by the action of cilia. Glucose, amino acids, salts, etc., are reabsorbed by the tubular cells and then secreted into the capillary blood cells by diffusion.

OR

In the liver, urea is formed during the ornithine cycle and is sent to the kidneys for elimination through the blood stream. It also serves to excrete cholesterol, bile pigments, vitamins and drugs. These substances are secreted in the bile and are taken to the intestine. Then they are eliminated along with faeces.

24. The nature of the lens is concave, i.e., it is a diverging lens.

25. A - Phytoplankton; C - Small fish D - Secondary carnivores; B - Herbivores

<div align="center">OR</div>

Hawk gets more energy in food chain having three trophic levels.

Plants→	Mice→	Hawks
100j	10j	1j

Plants → Mice → Snakes → Hawks

100 J → 10 J → 1 J → 0.1 J

Energy available to hawk is 1J in the food chain with three trophic levels, but it is 0.1 J in the food chain with four trophic levels. This is due to 10% energy law which states that only 10% energy is available at the next trophic level from the previous level.

26. Two main causes of a person developing near sightedness also known as Myopia are

  i. Excessive curvature of eye lens

  ii. Elongation of eyeball

    Can be corrected by using concave lens which is a divergent.

<div align="center">**Section C**</div>

27. i. Sulphur is a non-metal because of the following reason:

    a. It is a poor conductor of electricity.

    b. Sulphur is neither malleable nor ductile.

    c. Sulphur forms acidic oxide.

      $S + O_2 \longrightarrow SO_2$

      $SO_2 + H_2O \longrightarrow H_2SO_4$

  ii. Magnesium is metal because of the following reason.

    a. It is a good conductor of electricity.

    b. Magnesium is malleable nor ductile.

    c. It forms basic oxides

      $2Mg + O_2 \longrightarrow 2MgO$

28. i. Non-metals are the elements that do not conduct heat and electricity and are neither malleable nor ductile. Example: Carbon, sulphur, phosphorus, silicon, and oxygen.

  ii. Carbon is a non-metal which conducts electricity.

  iii. Iodine is a non-metal having lustre.

  iv. Carbon (Diamond) is a hard non-metal.

  v. Non-metals react with oxygen to form acidic oxides or neutral oxides. Carbon burns in air to form carbon dioxide. The nature of the product formed is acidic. When carbon dioxide dissolves in water, it forms carbonic acid. It turns blue litmus to red which shows it is acidic in nature.

<div align="center">OR</div>

  i.

Metal	Symbol	Atomic number	Electronic configuration K, L, M, N	No. of outermost electrons	Electron dot structures
Sodium	Na	11	2,8, 1	1	Na.
Oxygen	O	8	2,6	6	:O::

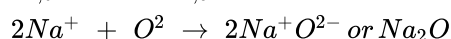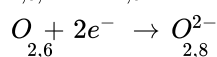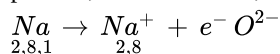| Magnesium | Mg | 12 | 2,8, 2 | 2 | Mg: |

ii. Formation of Na_2O:

The atomic number of sodium is 11 and it has only one valence electron.

Hence, electronic configuration of $_{11}Na$ is 2, 8, 1.

The atomic number of oxygen is 8 and it has 6 electrons in its valence shell.

Hence, electronic configuration of $_8O$ is 2, 6.

Sodium has a tendency to lose the valence electron and oxygen has a tendency to gain the electron lost by sodium. Since, sodium can lose only one electron of the valence shell, and oxygen atom needs two electrons to complete its octet in the valence electron, two atoms of sodium combine with one atom of oxygen. By losing valence electron, sodium is changed into Na^+ and by gaining two electrons lost by two sodium atoms, oxygen atom is changed into an oxide anion, O_2. In this process, both the atoms, sodium and oxygen, obtain the stable electronic configuration of the noble gas neon.

$$Na \atop 2,8,1 \to Na^+ \atop 2,8 + e^- \; O^{2-}$$

$$O \atop 2,6 + 2e^- \to O^{2-} \atop 2,8$$

$$2Na^+ + O^2 \to 2Na^+O^{2-} \; or \; Na_2O$$

The oppositely charged sodium ion, Na^+O^{2-} and oxide ion, O^{2-} are now held together by electrostatic force of attraction or by ionic or electrovalent bond. Na_2O is, therefore, an ionic or electrovalent compound.
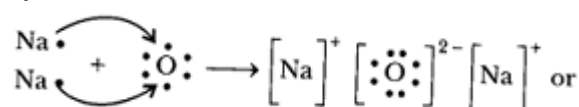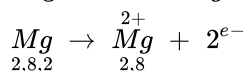

Formation of MgO:

The atomic number of magnesium = 12

Its electronic configuration is $K, \; L, \; M \atop 2, \; 8, \; 2$

It has two electronic in its outermost shell. So, the magnesium atom donates its 2 valence electrons and forms a stable magnesium ion, Mg^{2+} to attain the electronic arrangement of neon atom.

$$Mg \atop 2,8,2 \to Mg^{2+} \atop 2,8 + 2^{e-}$$

The atomic number of oxygen = 8

Electronic configuration = $K, \; L \atop 2 \; 6$

It has 6 electrons in its valence shell. Therefore, it requires 2 more electrons to attain the stable electronic arrangement of neon gas. Thus, oxygen accepts 2 electrons donated by magnesium atom and forms a stable oxide ion, O^{2-}

$$O \atop 2,6 + 2e^- \to O^{2-} \atop 2,8$$
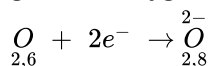
The oppositely charged magnesium ions, Mg^{2+}, and oxide ions, are held together by a strong force of electrostatic attraction to form magnesium oxide compound.

$Mg^{2+} O^{2-} \; or \; MgO$.
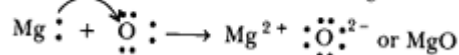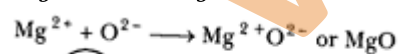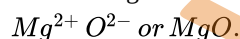
MgO is ionic compound.

iii. The ions present in Na_2O are sodium ions ($2Na^+$) and oxide ion O^{2-}.

The ions present in MgO are magnesium ion (Mg2+) and oxide ion O^{2-}.

29. i. Nutrition is necessary because

   a. it helps in the growth of new cells, survival and maintenance of cells.

   b. it is needed to develop resistance against diseases.

   c. it provides energy by the oxidation of food for metabolic processes.

 ii. The disappearance of green plants from Earth would mean a total disaster for the ecosystem.It will cause a decrease in concentration of oxygen to such a low level that it would not be sufficient for all the living organism for breathing. Green plants are the source of energy for all organisms. All other organisms directly or indirectly depend on them for food. So, if they disappear from the Earth, all the herbivores will die due to starvation and so will the carnivore. It would result in the extinction of life from the Earth.

30. When Mendel crossed a homozygous tall (TT) plant with homozygous dwarf (tt) plant, all plants in F_1 generation were tall (Tt).

Self crossing of F_1 gives F_2. F_2 generation had 3 tall : 1 recessive plants.

Since presence of dwarf allele was masked by tall allele in F_1, tall allele (T) was dominant over dwarf allele (t).
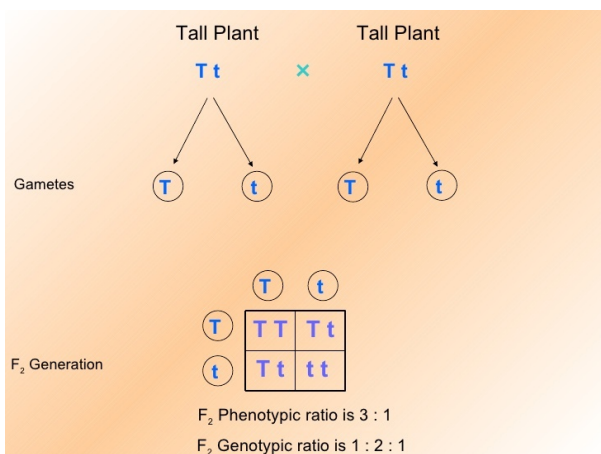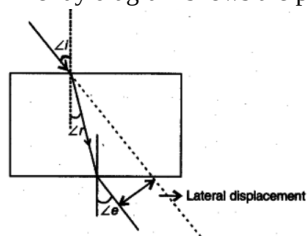

31. Refractive indices of Air, Ice and Benzene are 1.003, 1.31 and 1.5 respectively. Velocity of light in a medium is inversely proportional to refractive index of the medium. Light will travel fastest in air (having least refractive index i.e. 1.0003) and slowest in Benzene (having maximum refractive index i.e. 1.5)

32. i. Zero, current flows due to potential difference and not due to potentials.

   ii. The total energy consumed by the refrigerator in 30 days would be

   400 w $\times$ 8.0 hour/day $\times$ 30 days = 96000 Wh

   = 96 kWh

   Thus the cost of energy to operate the refrigerator for 30 days is

   96 kW h $\times$ ₹ 3.00 per kWh = ₹ 288.00

33. i. Energy consumed per day by refrigerator

   = 0.4kW $\times$ 10h [$\therefore$ power of refrigerator = 400 W $\frac{400}{1000} kW$ = 0.4kW]

   = 4 kWh

   Energy consumed per day by fans

   = 2 $\times$ 0.08kW $\times$ 6h [$\therefore$ power of each fan = $\frac{80}{1000}$ = 0.08 kW]

   = 0.96 kWh

   ii. Energy consumed per day by electric tubes

   = 6 $\times$ 0.018 kWh $\times$ 6h [$\therefore$ power of each electric tube = $\frac{18}{1000}$ = 0.018kW]

   = 0.648 kWh

Total energy consumed per day = 4 + 0.96 + 0.648 = 5.608 kWh

Energy consumed in 30 days = 30 $\times$ 5.608 = 168.24 kWh

Cost of 168.24 kWh

Cost of 168.24 units @ ₹ 3.00 = 168.24 $\times$ 3 = ₹ 504.72

Section D

34. i. Take 1 mL ethanol and 1 mL glacial acetic acid along with a few drops of concentrated sulphuric acid in a test tube.

   ii. Warm the contents in a water bath for at least 5 min.

   iii. Pour into a beaker containing 20-50 mL of water and smell the resulting mixture.

   iv. The sweet smell would be observed.

The reaction can be given by the following equation:

$$\underset{\text{(Ethanoic acid)}}{CH_3COOH} + \underset{\text{(Ethanol)}}{CH_3CH_2OH} \xrightarrow{\text{Acid}} \underset{\underset{O}{\underset{||}{}}}{CH_3\,C\,OCH_2CH_3}$$
$$\text{(Ester)}$$

OR

Compounds having same molecular formula but different structural formula are called structural isomers.

e.g. butane (C_4H_{10}) shows the following two structural isomers. One of which is straight chain n-butane and other is iso-butane.

Structure of benzene and cyclohexane are:

Benzene (C_6H_6) has six C-atoms and six H-atoms, it contains three double bonds alternately between two Carbon atoms and each carbon atoms bonds with one hydrogen. Cyclohexane (C_6H_{12}) has six C-atoms each possessing two H-atoms, thus, 12 H-atoms in total. It does not consist of any double bond it is saturated compound.

35. Budding is a form of asexual reproduction and is the process of production of new individual from an outgrowth called bud formed on the parent body. Regenerative cells present in Hydra are used for budding. Due to repeated mitotic divisions an outgrowth called bud develops from the parent body which enlarges in size and finally develops into a small hydra. After attaining suitable maturity the offspring get detached from the parent body and become an independent individuals.

OR

The pituitary gland has three lobes that secretes various hormones. It regulates various functions of the body i.e. growth, metabolism, sexual development and system of reproduction. It also controls the functioning of the other endocrine glands. Hence, it is called the master endocrine gland.

Location: Pituitary gland is about the size of a pea and is located in the centre of brain, just below the hypothalamus. It is also known as hypophysis.

Pituitary gland secretes five important hormones. The important hormones secreted by pituitary gland and their functions are listed below:

  i. **Growth hormone** regulates the growth and development of bones and muscles.
 ii. **Tropic hormone** regulates the secretion from other endocrine glands.
iii. **Prolactin** hormone regulates the function of mammary glands in females.
 iv. **Vasopressin hormone** regulates water and electrolyte balance in the body.
  v. **Oxytocin hormone** regulates the ejection of milk during lactation.

36.   i. The ray diagram shows the path of a ray of light incident obliquely on one face of a glass slab:

  ii. The glass refractive index is defined as the ratio between the speed of light in the vacuum and the speed of light in the glass.

Refractive index of glass (n_g) = Speed of light in vacuum/speed of light in the glass.
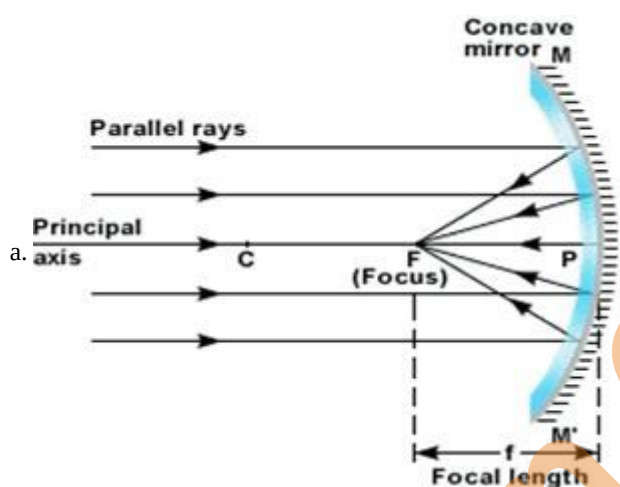
$n_g = \frac{3 \times 10^8}{2 \times 10^8}$

$n_g = 1.5$

  iii. $P = \frac{1}{f(in\,meter)}$

$f = \frac{1}{P} = \frac{1}{2.5} = \frac{1}{-25}$

$\Rightarrow f = \frac{-1000}{25}$ cm = - 40 cm

The focal length (f) of a concave lens is always negative.

<div align="center">OR</div>

a.

b. Given that f = -15 cm ; u = -25 cm; h_o = 4 cm; v = ?

The mirror formula is

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

$\frac{1}{-15} = \frac{1}{-25} + \frac{1}{v}$

$\frac{1}{v} = \frac{1}{25} - \frac{1}{15}$

$\frac{1}{v} = \frac{3-5}{75} = \frac{-2}{75}$

$\Rightarrow$ v = -37.5 cm

The screen should be placed 37.5 cm from the people of mirror and the image is real.

magnification

$m = \frac{h_i}{h_o} = \frac{-v}{u}$

$\frac{h_i}{4} = \frac{-(-37.5)}{-25}$

$\Rightarrow h_i = -\frac{37.5}{25} \times 4$ = -6 cm

So the image is enlarged and inverted.

c. Uses of concave mirror:

It is used as a shaving mirror.

It is used as reflector in torch, head light of automobiles etc.

<div align="center">**Section E**</div>

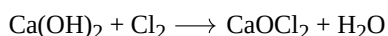37. **Read the text carefully and answer the questions:**

Salt of a strong acid and strong base is neutral with a pH value of 7. NaCl common salt is formed by a combination of hydrochloride and sodium hydroxide solution. This is the salt that is used in food. Some salt is called rock salt, bed of rock salt was formed when seas of bygone ages dried up. The common salt thus obtained is an important raw material for various materials of daily use, such as sodium hydroxide, baking soda, washing soda, and bleaching powder.

(i) Carbonic acid does not form an acidic salt.

(ii) Sodium bicarbonate, commonly known as baking soda or bicarbonate of soda, is a chemical compound with the formula $NaHCO_3$.

<div align="center">OR</div>

$Ca(OH)_2$ treatment with chlorine to obtain bleaching powder.

$$Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$$

38. **Read the text carefully and answer the questions:**

Following questions are based on the two tables given below. Study these tables related to blood sugar levels:

Table A (Blood glucose chart)

	Mean Blood Glucose Level (mg/dL)
Doctor's advice needed	380
	350
	315
	280
	250
	215
Good	180
	150
Excellent	115
	80
	50

Table B (Blood Report of Patient X and Y)

Time of check	Blood Glucose ranges (mg/dL)	
	Patient X	Patient Y
Before breakfast (Fasting)	<100	70-130
Before lunch, supper and snack	<110	70-130
Two hours after meals	<140	<180
Bedtime	<120	90-15

(i) Diabetes, Diabetes is caused due to less or no secretion of hormone insulin by pancreas.

(ii) Insulin level in the blood is responsible for the given disease.
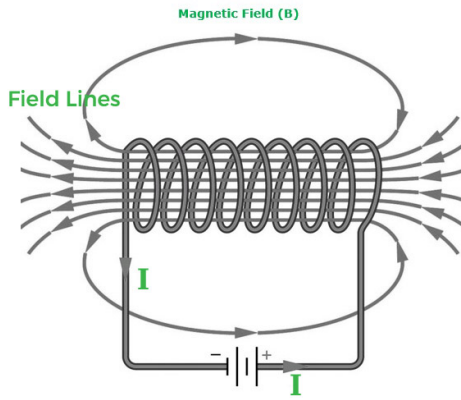
(iii) Low sugar high fibre diet

<div align="center">OR</div>

> 180mg/dL.

39. **Read the text carefully and answer the questions:**

An insulated copper wire wound on a cylindrical cardboard tube such that its length is greater than its diameter is called a solenoid. When an electric current is passed through the solenoid, it produces a magnetic field around it. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. The field lines inside the solenoid are in the form of parallel straight lines. The strong magnetic field produced inside a current-carrying solenoid can be used to magnetize a piece of a magnetic material like soft iron when placed inside the solenoid. The strength of the magnetic field

produced by a current-carrying solenoid is directly proportional to the number of turns and strength of the current in the solenoid.

(i) Magnetic field inside the infinite solenoid is uniform. Hence it is the same at all points.

(ii) The end of the current carrying solenoid at which the current flows anti-clockwise behaves as a north pole while that end at which the direction of current clockwise behaves as a south pole and this is according to clock wise.

(iii)For a long solenoid, magnetic field $B \propto In$; where I is the flowing current and n is number of turns per unit length in the solenoid. Therefore, in the given case magnetic field will remain unchanged.

OR

For a solenoid, if we imagine gripping the solenoid with your right hand so that your curl fingers follow the direction of the current then your thumb will point towards the north end of the electromagnet.