

**Class-X Session 2022-23**  
**Subject - Science (086)**  
**Sample Question Paper - 40**  
**With Solution**

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S. No.	Chapter Name	Section-A	Section-B	Section-C	Section-D	Section-E
		(MCQs & A/R) 1 Mark	(VSAQs) 2 Marks	(SAQs) 3 Marks	(LAQs) 5 Marks	(Case Study) 4 Marks
		Q. No.	Q. No.	Q. No.	Q. No.	Q. No.
1	Chemical Reactions and Equations	3(Q2,3,17)	1(Q21)	1(Q27)		
2	Acids, Bases and Salts	3(Q1,4,6)		1(Q28)		
3	Metals and Non-metals	1(Q5)	1(Q21 OR)			1(Q37)
4	Carbon and its Compounds	1(Q7)			1(Q34)	
5	Life Processes	1(Q8)		1(Q33)		1(Q38)
6	Control and Co-ordination	2(Q10,12)			1(Q35)	
7	How do Organism Reproduce	1(Q18)	1(Q26)	1(Q29)		
8	Heredity and Evolution	2(Q11,19)	1(Q24)			
9	Light- Reflection and Refraction			2(Q30,31)		1(Q39)
10	Human Eye and Colourful World		1(Q25)			
11	Electricity	2(Q14,16)				
12	Magnetic Effects of Electric Current	3(Q13,15,20)		1(Q32)	1(Q36)	
13	Our Environment	1(Q9)	2(Q22,23)			
	<b>* Total Questions (Total Marks)</b>	<b>20(20)</b>	<b>6(12)</b>	<b>7(21)</b>	<b>3(15)</b>	<b>3(12)</b>
						<b>80</b>

\* The number given outside the bracket denotes number of questions asked in the sample paper, while the number given inside the bracket denotes marks.

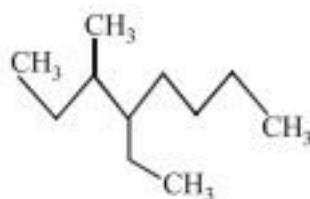
**General Instructions**

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 Answer type 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. Answer 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**

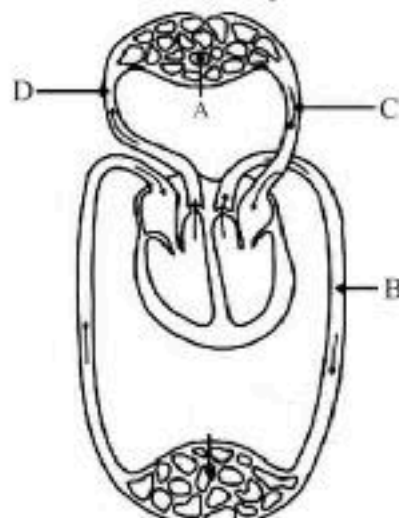
Select and write one most appropriate option out of the four options given for each of the Questions 1 to 20

1. Sodium carbonate is a basic salt because it is a salt of
  - (a) strong acid and strong base
  - (b) weak acid and weak base
  - (c) strong acid and weak base
  - (d) weak acid and strong base
2. A balanced chemical equation is in accordance with –
  - (a) Avogadro's law
  - (b) law of multiple proportion
  - (c) law of conservation of mass
  - (d) law of gaseous volumes.
3. Chlorine gas reacts with \_\_\_\_\_ to form bleaching powder.
  - (a) dry  $\text{Ca(OH)}_2$
  - (b) dil. solution of  $\text{Ca(OH)}_2$
  - (c) conc. solution of  $\text{Ca(OH)}_2$
  - (d) dry  $\text{CaO}$
4. One of the constituents of baking powder is sodium hydrogen carbonate, the other constituent is
  - (a) hydrochloric acid
  - (b) tartaric acid
  - (c) acetic acid
  - (d) sulphuric acid
5.  $\text{Al}_2\text{O}_3$  reacts with
  - (a) only water
  - (b) only acids
  - (c) only alkalis
  - (d) both acids and alkalis
6. Which of the following is not a mineral acid?
  - (a) Hydrochloric acid
  - (b) Citric acid
  - (c) Sulphuric acid
  - (d) Nitric acid
7. The correct name of the given compound is:



- (a) 2, 3-diethyl heptane
- (b) 5-ethyl-6-methyl octane
- (c) 4-ethyl-3-methyl octane
- (d) 3-methyl-4-ethyl octane

8. The given diagram is marked as A, B, C and D. Label A and C represents



- (a) Lung capillaries and Vena cava from body  
 (b) Pulmonary veins from lungs and Aorta to body  
 (c) Pulmonary artery to lungs and vena cava from body  
 (d) lung capillaries and pulmonary vein from lungs.
9. In the given food chain, suppose the amount of energy at fourth trophic level is 5 kJ, what will be the energy available at the producer level?  
 Grass → Grasshopper → Frog → Snake → Hawk  
 (a) 5 kJ (b) 50 kJ (c) 500 kJ (d) 5000 kJ
10. Growth of pollen tube towards ovule is an example of  
 (a) phototropism (b) geotropism (c) hydrotropism (d) chemotropism
11. A male child will be born if  
 (a) father is healthy  
 (b) mother is well fed during pregnancy  
 (c) genetic composition of child has XY set of chromosomes  
 (d) genetic composition of child has XX set of chromosomes.
12. Cytokinins are known to  
 (a) inhibit cytoplasmic movement.  
 (b) help in retention of chlorophyll.  
 (c) influence water movement.  
 (d) promote abscission layer formation.
13. Which of the following can produce a magnetic field?  
 (a) Electric charges at rest  
 (b) Electric charges in motion  
 (c) Only by permanent magnets  
 (d) Electric charges whether at rest or in motion
14. The resistance of a conducting wire doesn't depend upon:  
 (a) Area of cross section (b) Length  
 (c) Temperature (d) Voltage applied
15. Magnetic field lines caused by a solenoid:  
 (a) are curves. (b) start at north and end at south.  
 (c) form closed loops. (d) is uniform everywhere.
16. Which of the following statements does not represent Ohm's law?  
 (a) Current / Potential difference = Constant  
 (b) Potential difference / Current = Constant  
 (c) Potential difference = Current × Resistance  
 (d) Current = Resistance × Potential difference

**Directions: Q.No. 17–20 are Assertion - Reasoning based questions:** These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

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

17. **Assertion :** Corrosion of iron is commonly known as rusting.

**Reason :** Corrosion of iron occurs in presence of water and air.

18. **Assertion:** Spermatogenesis requires 72-74 days to get completed.

**Reason:** Sperms reach the epididymis and stay there for 2-3 days for maturation i.e., to become motile.

19. **Assertion:** The flower colour of sweet pea shows the inheritance of complementary genes.

**Reason:** The ratio obtained for complementary gene is 9 : 7.

20. **Assertion:** Magnetic field lines do not intersect each other.

**Reason:** There cannot be two direction of magnetic field at a point.

## SECTION-B

**Q. no. 21 to 26 are Very Short Answer Questions.**

21. (a) Write a balanced chemical equation for the reaction of potassium metal with water to give potassium hydroxide and hydrogen gas.  
(b) If in a chemical equation we find an arrow pointing upwards, what does it indicate?

**OR**

- (a) Why do silver ornaments turn blackish after some time ?  
(b) Name any two metals which are soft and can be cut with an ordinary knife.
22. (a) We do not clean ponds or lakes, but an aquarium needs to be cleaned regularly. Why?  
(b) Why is the ozone layer getting depleted at the higher levels of the atmosphere ? Mention one harmful effect caused by its depletion.
23. What is ozone? How and where is it formed in the atmosphere? Explain how does it affect an ecosystem.
24. In human beings, the statistical probability of getting either a male or a female child is 50%. Give reasons and explain with the help of a diagram.
25. What is meant by dispersion of light? Explain how the ray of white light is dispersed. Which colour deviates more?

**OR**

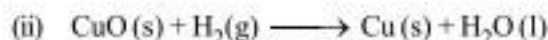
Make a diagram to show how hypermetropia is corrected. The near point of a hypermetropic eye is 1m. What is the power of lens required to correct this defect ? Assume that the near point of the normal eye is 25 cm.

26. (a) Name the reproductive and non-reproductive parts of bread mould (Rhizopus).  
(b) List any two advantages of vegetative propagation.

## SECTION-C

**Q.no. 27 to 33 are Short Answer Questions.**

27. (a) What is rancidity ? What is the general name of chemical which are added to fat and oil containing food so as to prevent the development of rancidity?  
(b) Metal X becomes green when left in air, turns black when heated in air. Name the metal and the compounds formed in both the cases?
28. (a) Identify the substances that are oxidised and the substances that are reduced in the following reactions.



- (b) Name the oxidising and reducing agent in the following reaction:



29. (a) Describe the parts of a flower.  
(b) Draw a labelled diagram of the longitudinal section of a flower.
30. An object of height 6 cm is placed perpendicular to the principal axis of a concave lens of focal length 5 cm. Use lens formula to determine the position, size and nature of the image if the distance of the object from the lens is 10 cm.
31. If the image formed by a mirror for all positions of the object placed in front of it is always erect and diminished, what type of mirror is it? Draw a ray diagram to justify your answer. Where and why do we generally use this type of mirror?
32. On what factors the strength of magnetic field depends around
  - (a) a straight current carrying conductor.
  - (b) a circular wire carrying current.

**OR**

Name, state and explain with an example the rule used to determine the direction of force experienced by a current carrying conductor placed in a uniform magnetic field.

33. (a) Draw a diagram depicting human alimentary canal and label gall bladder, liver and pancreas.  
(b) State the roles of liver and pancreas.  
(c) Name the organ which performs the following functions in humans:
  - (i) Absorption of digested food
  - (ii) Absorption of water

### SECTION-D

**Q.no. 34 to 36 are Long Answer Questions.**

34. Define covalent bond? What do you mean by the term covalency. Give an example of each containing (a) single bond  
(b) double bond (c) triple bond.

**OR**

Write down the chemical equations to represent the reaction of ethanoic acid with:

- (a) Sodium metal
- (b) Sodium carbonate
- (c) Sodium hydroxide
- (d) Ethanol in the presence of a little conc.  $H_2SO_4$
- (e) Heating with NaOH in presence of CaO.
35. (a) Write the names and more one function of each of three growth hormones in plants.  
(b) In the absence of muscle cells, how do plant cells show movement?
36. (i) What is a solenoid?  
(ii) Draw the pattern of magnetic field formed around a current carrying solenoid. Compare this field to that of a bar magnet.  
(iii) Explain an activity to show that a current carrying conductor experiences a force when placed in a magnetic field.

### SECTION-E

**Q.no. 37 to 39 are case -based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.**

37. Read the following case/passage and answer the questions.

Non-metals are the elements which are generally poor conductors of heat and electricity except for graphite which conducts electricity. Most properties of non-metals are the opposite of metals. They are neither malleable nor ductile. Non-metals form negatively charged ions by gaining electrons on reaction with metals. Non-metals form oxides which are either acidic or neutral. Non-metals have a wide variety of uses. Non-metals are used in the manufacture of rubber, for tires, in gunpowder, fireworks and other material in fertilizers, as disinfectant.

- (a) (i) Name the element which shows conducting property like metals.  
(ii) Which insulating material is used for the coating of electrical wires?
- (b) Give reason for non-metals not used as reducing agent.

**OR**

- (b) Among  $P_2O_5$ ,  $Al_2O_3$ ,  $Fe_2O_3$  which one is acidic oxide and why?



38. Read the following case/passage and answer the questions.

The main excretory system in humans is the urinary system. The skin also acts as an organ of excretion by removing water and small amounts of urea and salts. They remove urea, toxins, medications and excess ions and form urine. The kidneys also balance water and salts as well as acids and bases. Nephron is called as functional unit of kidney. It is the structure that actually produces urine in the process of removing waste and excess substances from the blood.

- (i) What is the approximate length and thickness of kidneys?
- (ii) Which structure allows the entry of blood vessels, lymph vessels and nerves to enter kidney?
- (iii) Write the correct order of processes that occur in urine formation?
- (iv) What is the order of toxicity among ammonia, urea and uric acid (from lower to higher)?

39. Read the following case/passage and answer the questions.

The bending of the light ray from its path in passing from one medium to the other medium is called refraction of light. If the refracted ray bends towards the normal relative to the incident ray (Passing obliquely), then the second medium is said to be denser than the first medium. But if the refracted ray bends away from the normal, then the second medium is said to be rarer than the first medium. If a ray of light passing normally i.e., at right angles from one medium to another optical medium then it does not bend or deviate from its path. Refraction of light takes place due to change in the speed of light as it enters from one medium to another medium.

- (a) You are given water, mustard oil, glycerine and kerosene. In which of these media, a ray of light incident obliquely at same angle would bend the most?
- (b) For the same angle of incidence; the angle of refraction in three different media A, B and C are  $150^\circ$ ,  $25^\circ$  and  $35^\circ$  respectively. In which medium velocity of light will be minimum?
- (c) Explain : A stick partly immersed in water appears to be bent at the surface of water.

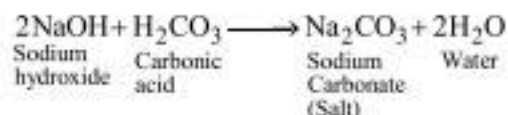
**OR**

- (c) Light enters from air to glass having refractive index 1.50. What is the speed of light in the glass ? The speed of light in vacuum is  $3 \times 10^8 \text{ m/sec}$ .

# SOLUTIONS

## SAMPLE PAPER-1

1. (d) The salt of a weak acid (carbonic acid,  $\text{H}_2\text{CO}_3$ ) and a strong base (sodium hydroxide,  $\text{NaOH}$ ) is sodium carbonate ( $\text{Na}_2\text{CO}_3$ ).



2. (c)  
 3. (a) dry  $\text{Ca}(\text{OH})_2$   
 4. (b) Baking powder is a mixture of baking soda  $\text{NaHCO}_3$ , (sodium hydrogen carbonate) and a mild edible acid like tartaric acid.  
 5. (d)  $\text{Al}_2\text{O}_3$  is an amphoteric oxide, so it can react with both acids and alkalis, e.g.  
 6. (b) Citric acid is an example of organic acid or edible acid while  $\text{HCl}$ ,  $\text{H}_2\text{SO}_4$  and  $\text{HNO}_3$  are mineral acids.  
 7. (c) The name of the compound is 4-ethyl-3-methyl octane.  
 8. (d)  
 9. (d) Only 10% of the energy entering a particular trophic level of organisms is available for transfer to the next higher trophic level according to 10% law. In this food chain, at the 4th trophic level, only 5 kJ energy is available to the snake. Thus, the energy available at the producer level will be 5000 kJ.  
 10. (d) Growth of pollen tube towards ovule is an example of chemotropism.  
 11. (c) Because 'XX' chromosomes comes from mother and 'XY' chromosomes comes from father it means 'XY' chromosomes is responsible for male child.  
 12. (b)  
 13. (b) Magnetic field (B) is produced by moving charge.  
 14. (d) The resistance of a conducting wire doesn't depend upon applied voltage.  
 15. (c) Magnetic fields lines caused by solenoid forms close loop.  
 16. (d) Ohm's law states that the potential difference (voltage) across an ideal conductor is proportional to the current through it.  
 $V = IR$   
 17. (b) Corrosion occurs due to oxidation of iron.  
 18. (c) Assertion is correct but Reason is incorrect. Sperm reach the epididymis and stay there for 8-17 days for maturation.  
 19. (a) Both Assertion and Reason are correct and the Reason is a correct explanation of Assertion. 9 purple and 7 white flowers are obtained in sweet pea (*Lathyrus odoratus*).  
 20. (a)

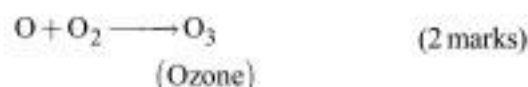
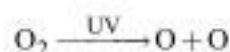
21. (a)  $2\text{K(s)} + 2\text{H}_2\text{O(l)} \longrightarrow 2\text{KOH(aq)} + \text{H}_2\text{(g)}$  (1 mark)  
 (b) Gaseous state (1 mark)

OR

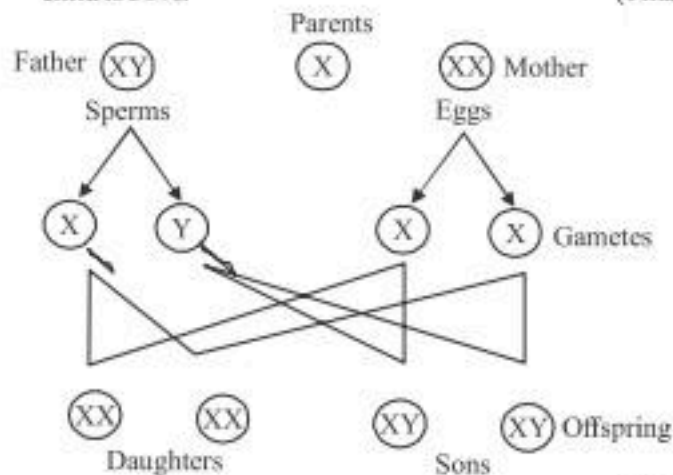
- (a) Silver ornaments gradually turn black due to the formation of a thin silver sulphite layer on their surface by the action of hydrogen sulphide gas present in air. (1 mark)  
 (b) (i) Sodium (ii) Potassium ( $\frac{1}{2} + \frac{1}{2} = 1$  mark)  
 22. (a) Ponds and Lakes are natural ecosystems as they contain decomposers which act as a cleaning agents, whereas an aquarium is an artificial ecosystem, which do not contain decomposers that clean it. Hence It need to be clean periodically.  
 (b) Ozone Layer getting depleted at the higher levels of the atmosphere due to effect of chlorofluorocarbons (CFCs).  
 Its harmful effect is skin cancer. (1 + 1 marks)  
 23. Ozone is molecule which contains three atoms of oxygen ( $\text{O}_3$ ). It is highly poisonous gas present on the upper layer of the atmosphere. (1 mark)

Formation of ozone— The UV radiations split some molecular oxygen ( $\text{O}_2$ ) apart into free oxygen atoms ( $\text{O} + \text{O}$ ). These atoms then combine with molecular oxygen to form ozone. (1 mark)

OR



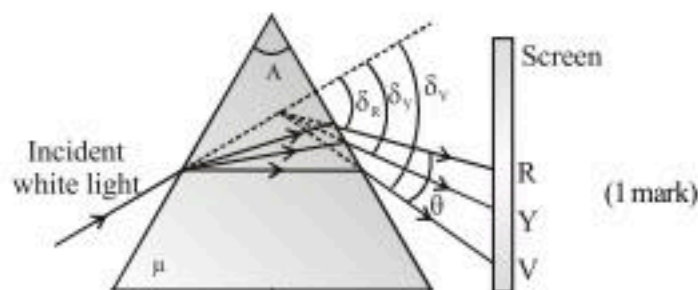
24. A child inheriting an X chromosome from the father would be a girl (XX) while a child inheriting a Y chromosome from the father would be a boy (XY). Chromosome is the sex of the child & determined by what inherited from father, therefore the probability of having either male or female child is 50%. (1 mark)



(1 mark)



25. When white light splits into its seven constituent colours (VIBGYOR) on passing through a prism, is known as dispersion of light.



Refractive index of glass is different for different components of white light. As different colours of light pass through a prism, they bend through different angles with respect to the incident ray.

The red light bends the least while the violet bends the most. Thus, the rays of different colours emerge along different paths and get dispersed. (1 mark)

OR

Hypermetropia is corrected by using convex lens of suitable focal length.

$$v = -1 \text{ m} = -100 \text{ cm}$$

$$u = -25 \text{ cm}$$

According to lens formula,

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \quad (\frac{1}{2} \text{ mark})$$

Near point of a Hypermetropic eye

$$\frac{1}{f} = -\frac{1}{100} - \frac{1}{-25} = -\frac{1}{100} + \frac{1}{25}$$

$$\frac{1}{f} = \frac{-1+4}{100} = \frac{3}{100} \quad (\frac{1}{2} \text{ mark})$$

Hypermetropic eye

$$f = \frac{100}{3} \text{ cm}$$

$$\text{Power, } P = \frac{1}{f} = \frac{3 \times 100}{100} = 3\text{D} \quad (\frac{1}{2} \text{ mark})$$



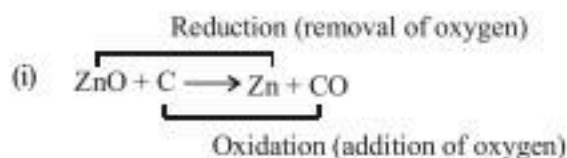
Correction for Hypermetropic eye

26. (a) Reproductive part of bread mould is sporangium. While non-reproductive part of bread mould is hyphae.  
(b) Advantages of vegetative propagation are:  
(i) Produces identical quality as the parent.

- (ii) Plants do not have seed viabilities, hence can be reproduce. (1 + 1 marks)

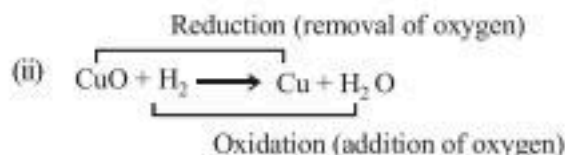
27. (a) The oil and fat containing food when left exposed to air reacts with oxygen and gets oxidised forming a toxic chemical called rancid, this process is called rancidity. The general name of the chemicals that are added to prevent this oxidation are called as antioxidants. For example, Nitrogen gas is anti-oxidant. (1½ marks)  
(b) Metal X is copper. Green compound is due to formation of copper carbonate and black colour compound is due to the formation of copper oxide. (1½ marks)

28. (a)



Therefore the substance

Oxidised = C, Reduced = Zn (1 mark)

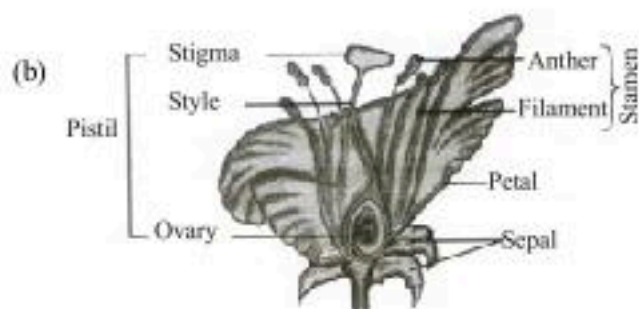


Therefore the substance:

Oxidised = H<sub>2</sub>, Reduced = CuO (1 mark)

- (b) H<sub>2</sub>S is the reducing agent while SO<sub>2</sub> is the oxidising agent. (1 mark)  
29. (a) A flower is a seed-bearing part of a plant, consisting of reproductive organs (stamens and carpels) that are typically surrounded by a brightly coloured corolla (petals) and a green calyx (sepals). A typical flower consists of following parts:  
(i) **Sepals:** It is the outer whorl of the flower. It is usually green in colour but in some flower it may be coloured to attract insects.  
(ii) **Petals:** It is the second whorl of flower and consists of coloured petals.  
(iii) **Stamen:** It is male reproductive part of a flower. Each stamen consists of a stalk called filament and a flattened top called the anther.  
(iv) **Carpel:** Carpels have a swollen ovary at the base, an elongated middle style and a terminal stigma. The ovary contains ovules. Each ovule possess an egg which is female gamete. (4 × ½ = 2 marks)





(1 mark)

30. A concave lens always forms a virtual and erect image on the same side of the object.

Image on the same side of the object.

Image distance,  $v = ?$

Focal length,  $f = -5$  cm

Object distance  $u = -10$  cm

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

$$\frac{1}{v} = \frac{1}{f} + \frac{1}{u} = \frac{1}{-5} + \frac{1}{-10}$$

$$= \frac{-1-2}{10} = \frac{-3}{10}$$

(1 ½ marks)

$$v = -3.3 \text{ cm}$$

$$\frac{\text{Size of the image}}{\text{Size of the object}} = + \frac{v}{u}$$

$$\frac{h}{6} = \frac{3.3}{10}$$

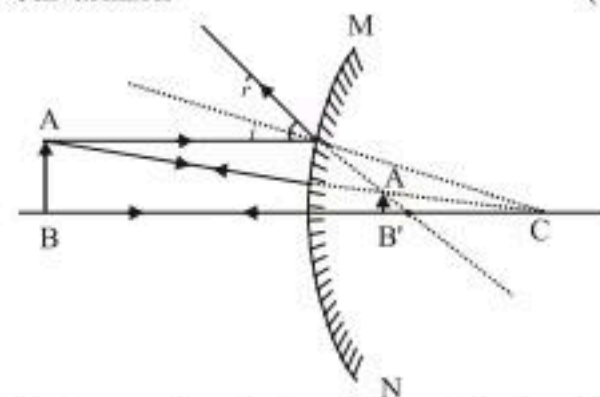
$$h_1 = \frac{6 \times 3.3}{10} = \frac{19.8}{10} = 1.98 \text{ cm.}$$

(1 ½ marks)

Size of the image is 1.98 cm.

31. Convex mirror

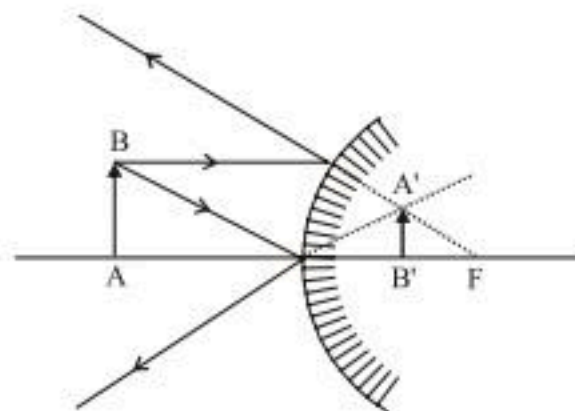
(1 mark)



**Use:** As rear view mirror in vehicles and also in malls, hotels, airports for security reasons because it forms an erect image, and wider field of view.

(1 mark)

The type of a mirror is convex mirror.



Convex mirror can be used as rear view mirrors in automobiles because it gives a wider field of view as the mirror is curved outward. It produces erect and diminished image of the traffic behind the driver of the vehicle.

(1 mark)

32. The factors on which strength of magnetic field depends:

(a) **Around a straight current carrying conductor**

- Current *i.e.* it is directly proportional to the current flowing through the conductor.
- Distance from the wire : Strength of magnetic field is inversely proportional to the distance from the wire carrying current. (1 ½ marks)

(b) **Around a circular coil carrying current**

- Current *i.e.*, it is directly proportional to the current flowing through the conductor.
- Radius of coil, it is inversely proportional to the radius of coil. (1 ½ marks)

**OR**

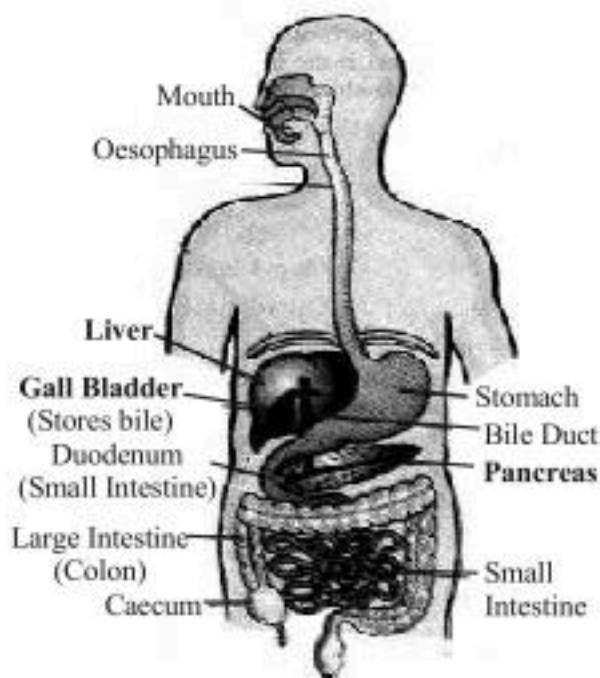
**Fleming's Left Hand Rule:** The direction of force which acts on the current carrying conductor placed in a magnetic field is given by Fleming's left hand rule. It states that if the forefinger, thumb and middle finger of left hand are stretched mutually perpendicular and the forefinger point along the direction of external magnetic field, middle finger indicates the direction of current, then thumb indicates along the direction of force acting on the conductor.

(2 marks)

**Example:** When an electron enters a magnetic field at right angles, the direction of force on electron is perpendicular to the direction of magnetic field and current according to this rule.

(1 mark)

33. (a) **Diagram of human alimentary canal**



(1 mark)

- (b) (i) **Role of Liver:** Decomposition of haemoglobin, formation and secretion of bile for emulsification of fat. Formation of urea, heparin, fibrinogen and prothrombin. Detoxification of chemicals and elimination of pathogens.
- (ii) **Role of Pancreas:** Secretion of pancreatic juice having lipase, trypsin, and amylase, secretion of hormones, insulin and glucagon. ( $2 \times \frac{1}{2} = 1$  mark)
- (c) (i) **Absorption of Digested Food:** Ileum part of small intestine.
- (ii) **Absorption of Water:** Large intestine.

( $2 \times \frac{1}{2} = 1$  mark)

34. Covalent bond formation involves sharing of electrons between bonding atoms which may be either same or different.

(1 mark)

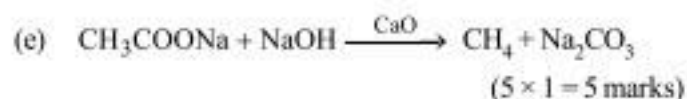
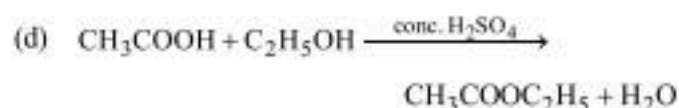
Covalency: The number of electrons contributed by an atom for sharing is known as its covalency. (1 mark)

**Example:**

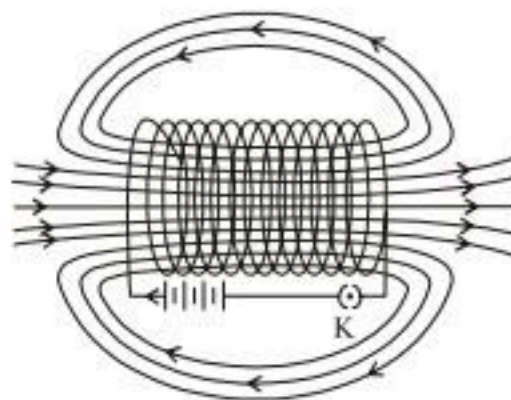
- (a) ; H-H
- (b) ; O=O
- (c) ; N=N (1 x 3 = 3 marks)

**OR**

- (a)  $2\text{CH}_3\text{COOH} + 2\text{Na} \longrightarrow 2\text{CH}_3\text{COONa} + \text{H}_2\uparrow$
- (b)  $2\text{CH}_3\text{COOH} + \text{Na}_2\text{CO}_3 \longrightarrow 2\text{CH}_3\text{COONa} + \text{CO}_2\uparrow + \text{H}_2\text{O}$
- (c)  $\text{CH}_3\text{COOH} + \text{NaOH} \longrightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O}$



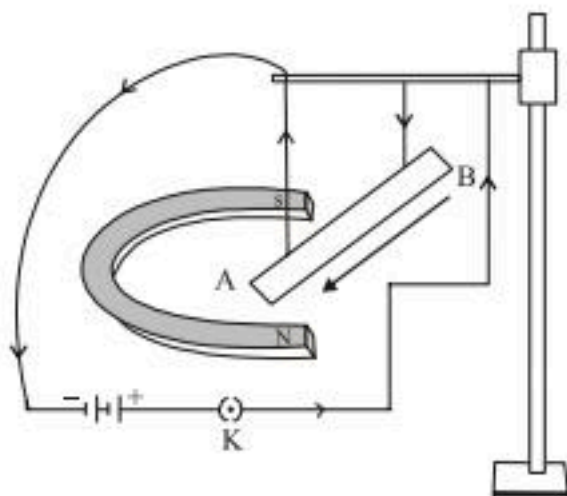
35. (a) Three growth hormones in plant are-
- (i) **Auxin:** It is synthesised in the young tip of roots and shoots. It promotes elongation and division of cell and root formation.
- (ii) **Gibberellins:** They help in the growth of the stem and flowers.
- (iii) **Cytokinins:** They promote cell division and delay leaf ageing. (3 x 1 = 3 marks)
- (b) The ability of a plant to recognise change and respond to that change is termed as the sensitivity of the plant. Yet plants have no nervous system and no muscle tissue, they use electrical and chemical means to convey the information from one cell to another cell. The leaves of the sensitive plant (*Mimosa pudica*) folds up in response to touch. These leaf movements are independent of growth whereas, the directional movements of the shoot of a germinating seedling breaking through the soil is growth dependent. (2 marks)
36. (i) A coil of many circular turns of insulated copper wire wrapped closely in a cylindrical shape is called solenoid. (1 mark)
- (ii) magnetic fields of a solenoid and a bar magnet are similar. (1½ marks)



- (iii) A small aluminium rod suspended horizontally from a stand using two connecting wires. Place a strong horse shoe magnet in such a way that the rod lies between the two poles with the magnetic field directed upwards. For this put the north pole of the magnet vertically below and south pole vertically above the aluminium rod. Now connect the aluminium rod in series with a battery, a key and a rheostat. Pass a current through the aluminium rod from one end to other. The rod is displaced towards



left. The displacement of rod will be towards right, when the direction of current flowing through the rod is reversed. (2 ½ marks)



37. (a) (i) Graphite, one of the allotropes of carbon shows conducting property like metal. (1 mark)  
 (ii) Polyrinyolchloride (PVC) is used as an insulating material. (1 mark)  
 (b) Non-metals have tendency to accept electrons from other species and get reduced itself. This means that it oxidizes the other species and act as oxidizing agent. (2 marks)

OR

- (b)  $P_2O_5$  is an acidic oxide. It produces phosphoric acid on reacting with water.  

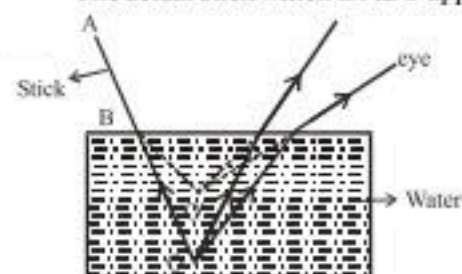
$$P_2O_5 + 3H_2O \longrightarrow 2H_3PO_4$$
 (2 marks)  
 38. (i) The approximate length and thickness of kidney is 11 cm and 3 cm.

- (ii) Hilum allows the entry of blood vessels, lymph vessels and nerves to enter kidney.  
 (iii) The correct order of processes that occur in urine formation is :  
 Glomerular filtration  $\rightarrow$  reabsorption  $\rightarrow$  secretion.  
 (iv) The correct order of toxicity is  
 uric acid < urea < ammonia (4  $\times$  1 = 4 marks)  
 39. (a) Among the given material kerosene refractive index,  $\mu = 1.44$ , water  $\mu = 1.33$ , mustard oil  $\mu = 1.46$  and glycerine  $\mu = 1.74$ . Glycerine is most optically denser. Therefore, ray of light bend most in glycerine.

(1 mark)

- (b) In medium B. (speed of light is higher in a rarer medium). (1 mark)  
 (c) A stick partially immersed in water appears to be bent due to refraction of light. When a ray of light travels from water to air (i.e. denser to rarer medium) from the point O, then it bends away from the normal. On extending these refracted rays on other sides, the rays appear to meet at O'.

The actual stick which is ABO appears to be as ABO'.



(2 marks)

OR

- (c)  $a_{\mu_g} = 1.5$  ;  $v = ?$  ;  $c = 3 \times 10^8$  m/sec

$$a_{\mu_g} = \frac{c}{v} \Rightarrow v = \frac{c}{a_{\mu_g}} = \frac{3 \times 10^8}{1.5} = 2 \times 10^8 \text{ m/sec}$$

(2 marks)