COIMBATORE SAHODAYA SCHOOL COMPLEX

SCIENCE (086) 2024-25

SET A

CLASS: X **Total Marks: 80**

Duration: 3Hours

General Instructions:

1. *All questions would be compulsory. However, an internal choice of approximately 33%would be provided. 50% marks are to be allotted to competency-based questions.*
2. *Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning typequestions carrying 1 mark each.*
3. *Section B would have 6 Short Answer (SA) type questions carrying 02 marks each.*
4. *Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.*
5. *Section D would have 3 Long Answer (LA) type questions carrying 05 marks each.*
6. *Section E would have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks*

SECTION A (20X1=20M)

1. Which one of the following is a decomposition reaction?

(a). $2H_2+O_2$----$2H_2O$ (b)$Zn+CuSO_4+ Cu$

(c)$2KClO_3$---- $2KCl +3O_2$ (d) $Na+ Cl_2$----- NaCl 1

2. Match the following and select the correct option.

Column A	**Column B**
1.Metal that displaces hydrogen from steam	A. Nitrogen
2. Nonmetal that shows catenation	B. Aluminium
3. Metal that exhibits variable valency	C. Iron
4. Metal that forms a protective oxide layer	D. Zinc
5. Nonmetal used in fertilizers	E.Carbon

(a)1-A, 2-B, 3-C, 4-D, 5-E (c)1-D, 2-E, 3-C, 4-B, 5-A

(b) 1-C, 2-D, 3-B, 4-E, 5-A (d) 1-B, 2-C, 3-A, 4-D 5-`E 1

3. Anita added a drop each of diluted acetic acid and hydrochloric acid on a pH paper and compared the colors. Which of the following is the correct conclusion?

(a) pH of acetic acid is more than that of hydrochloric acid.

(b) pH of acetic acid is less than that of hydrochloric acid.

(c)Acetic acid dissociates completely in aqueous solution.

(d) Acetic acid is a strong acid. 1

4. When a small amount of acid is added to water, the phenomenon that occurs is:

(i) Dilution (ii) Neutralisation (iii) Formation of H_3O^+ ions (iv) salt formation 1

The correct statements are:

(a) (i) and (iii) (b) ii and (iv) (c) (i) and (ii) (d) (iii) and (iv) 1

5. Identify 'x', 'y' and 'z' in the following reaction :

$$2KClO_{3(x)} \xrightarrow{y} 2KCl_{(x)} + O_{2(z)}$$

(a) x = gas; y = reaction condition; z = gas
(b) x = solid; y = liquid; z = gas
(c) x = number of moles of $KClO_3$; y = reaction condition; z = number of molecules of oxygen
(d) x = physical state of $KClO_3$ and KCl; y = reaction condition, z = physical state of O_2. 1

6. Which of the following is the correct arrangement of the given metals in ascending order of their reactivity?

Zinc, Iron, Magnesium, Sodium

(a) Zinc > Iron > Magnesium > Sodium

(b) Sodium > Magnesium > Iron > Zinc

(c) Sodium > Zinc > Magnesium > Iron

(d) Sodium > Magnesium > Zinc > Iron 1

7.Which of the following reaction is an endothermic reaction?

(a) Burning of coal (b) Decomposition of vegetable matter into compost

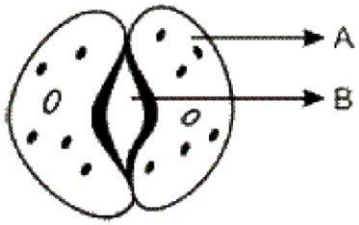
(c) Process of respiration

(d) Decomposition of calcium carbonate to form quick lime and carbon dioxide. 1

8. The breakdown of pyruvate to give carbon dioxide, water and energy takes place in

(a) cytoplasm (b) mitochondria. (c) chloroplast. (d) nucleus. 1

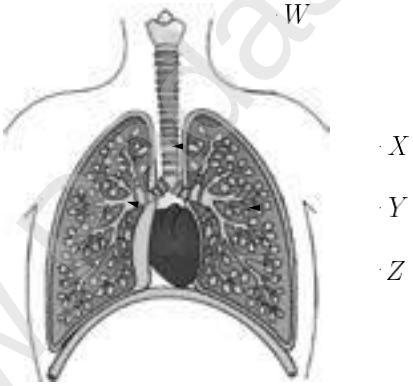
9. The parts shown as A and B in the given diagram are



(a) A is epidermal cell, B is stomatal pore (c) A is guard cell, B is stomatal pore

(b) A is epidermal cell, B is guard cell (d) A is guard cells, B is epidermal cell 1

10. The diagram shows part of the human respiratory system.



What are *W*, *X*, *Y* and *Z* ? 1

S.No.	Bronchus	Bronchiole	Larynx	Rings of cartilage
a.	*W*	*X*	*Z*	*Y*
b.	*X*	*Z*	*Y*	*W*
c.	*Y*	*W*	*X*	*Z*
d.	*Z*	*Y*	*W*	*X*

11. Which of the following statements are true about the brain?

(i) The main thinking part of the brain is hind brain.

(ii) Centers of hearing, smell, memory, sight, etc. are located in fore brain.

(iii) Involuntary actions like salivation, vomiting, blood pressure is controlled by the medulla in the hind brain.

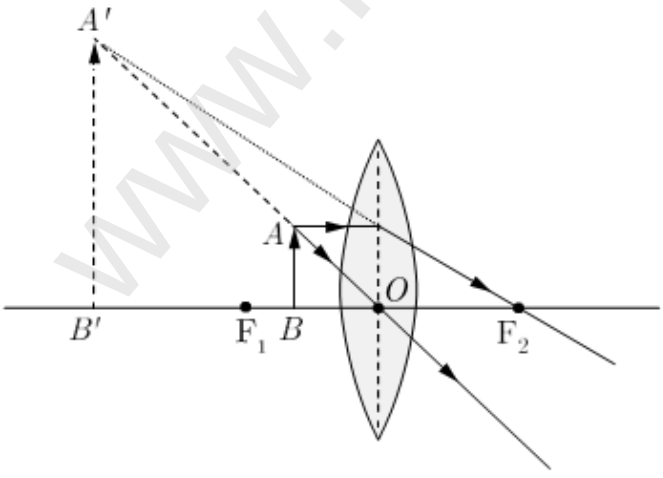
(iv) Cerebellum does not control posture and balance of the body.

(a) (i) and (ii) (b) (i), (ii) and (iii) (c) (ii) and (iii) (d) (iii) and (iv) 1

12. The directional movement in plants as shown in figure is due to which plant hormone?

(a) Abscisic acid (c) Cytokinins
(b) Auxin (d) Ethylene 1

13.



The above lens has a focal length of 10 cm. The object of height 2 mm is placed at a distance of 5 cm from thepole. Find the height of the image.

(a) 6.67 mm (c) 4 cm
(b) 3.33 mm (d)4 mm 1

14. Red colour is used as danger sign as

(a) red colour scattered least by smoke (c) red colour scattered most by smoke

(b) Red colour absorbs by the smoke (d) red colour moves fast in air 1

15. In a given food chain if the amount of energy at the fourth trophic level is 6 kJ, what will be the energy available at the producer level?

(a) 6000 kJ (b) 20 kJ (c) 60 kJ (d) 600 kJ 1

16 In an ecosystem, the 10% of energy available for transfer from one trophic level to the next is in the form of:

(a) heat energy (b) light energy (c) chemical energy (d) mechanical energy 1

Following questions 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 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.

17. **Assertion(A):** When Zinc is added to dilute hydrochloric acid, hydrogen gas is given off.

Reason (R) : Hydrogen chloride molecules contain chlorine atoms and hydrogen atoms. 1

18. **Assertion(A)** : The offspring produced by sexual reproduction is likely to adjust better in environmental fluctuation.

Reason (R) : During the fusion of gametes there is mixing of genetic material from Two parents. 1

19. **Assertion(A)**: Full length image of a distant object, such as a tall building, can be seen in a convex mirror.

Reason (R): A convex mirror has a greater focal length than a concave mirror of the same aperture. 1

20. **Assertion (A)** : Decomposers act as cleaning agents of the environment.

Reason (R) : The decomposers recycle waste material in the hydrosphere. 1

SECTION B

21. 2 g of ferrous sulphate crystals are heated in a dry boiling tube.

(a) List any two observations.
(b) Write balanced chemical equation for the reaction and name the products formed. 2

22. How does touching triggers a mimosa plant to close its leaves? 2

23. (a) What is the function of septum in our heart?

(b) Give one function of lymph in our body. 2

OR

(a) What happens if Xylem tissues are damaged?
(b) What is the importance of transpiration in plants? 2

24. Draw ray diagrams to show the formation of three times magnified (a) real, and (b) virtual image of an object by a converging lens. Mark the positions of O, F and 2F in each diagram. 2

25. A bulb is rated at 5.0 V, 100 mA. Calculate its (a) power and (b) resistance. 2

OR

Calculate the resistance of a metal wire of length 2m and area of cross section 1.55×10^{6} m^2, if the resistivity of the metal be 2.8×10^{-8} Ωm. 2

26. How is ozone formed in the higher level of the atmosphere? "Damage to ozone layer is a cause of concern". Justify this statement. 2

SECTION C

27. Explain the following:

(a) Reactivity of Al decreases if it is dipped in cone. HNO_3

(b) Carbon cannot reduce the oxides of Na or Mg.

(c) NaCl is not a conductor of electricity in solid state whereas it does conduct electricity in aqueous solution as in molten state. 3

28. Mention with reason the colour changes observe when:
(i) silver chloride is exposed to sunlight.

(ii) copper powder is strongly heated in the presence of oxygen.
(iii) a piece of zinc is dropped in copper sulphate solution. 3

29. Draw the diagram of a nephron and explain the stage of urine formation. 3

30. If we cross pure-breed tall (dominant) pea plant with pure-breed dwarf (recessive) pea plant we will get pea plants of F_1 generation.
If we now self-cross the pea plant of F_1 generation, then we obtain pea plants of F_2 generation.
(a) What do the plants of F_1 generation look like?
(b) State the ratio of tall plants to dwarf plants in F_2 generation.
(c) State the type of plants not found in F_1 generation but appeared in F_2 generation, mentioning the reason for the same. 3

31. (a)Explain why the planets do not twinkle?

(b) Why does the sun appear reddish early in the morning? 3

32. A nichrome wire has a resistance of 10 Ω. Find the resistance of another nichrome wire, whose length is three times and area of cross-section four times the first wire. 3

33. What is solenoid? Draw the pattern of magnetic field lines of
(i) a current carrying solenoid and
(ii) a bar magnet.
List two distinguishing features between the two fields. 3

SECTION D

34. What is meant by isomers? Draw the structures of two isomers of $C_4H_{10}$and write their IUPAC name. Explain why we cannot have isomers of first three members of alkane series? 5

OR

Distinguish between esterification and saponification reaction with the help of the chemical equations for each. State one use of each (i) esters, and (ii) saponification process. 5

35. Suggest three contraceptive methods to control the size of human population which is essential for the health and prosperity of a country. State the basic principle involved in each. 5

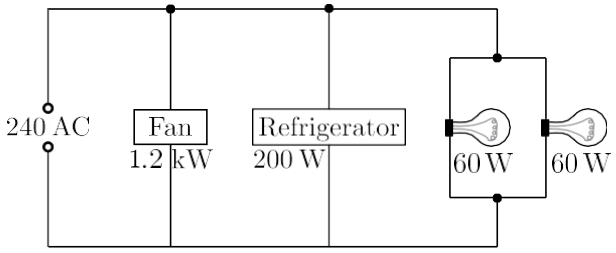
OR

(a)Differentiate between binary fission and multiple fission.

(b)Draw and explain the method of regeneration. Why is regeneration not considered as an actual mode of reproduction? 5

36. Inside the house, connections to all the devices are made in parallel, each having independent switch and fuse(if necessary). Thus, whenever some fault occurs in circuit of

one particular device in one room, devices in other rooms do not suffer.
Figure shows a 240V AC mains circuit to which a number of appliances are connected and switched on.



(i) Calculate the power supplied to the circuit.
(ii) Find out the value of electric current in the refrigerators.
(iii) Calculate energy used by the fan in 2 hours.
(iv) Calculate resistance of the filament of one lamp. 5

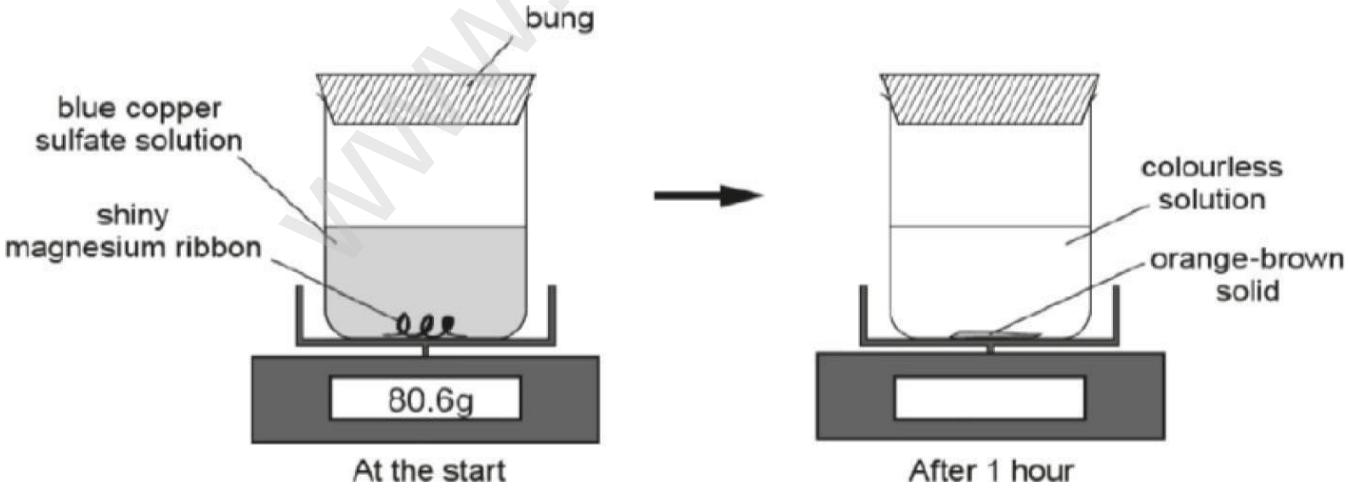
OR

Two bulbs A and B are rated as 90W–120V and 60W–120V respectively. They are connected in parallel across a 120V source. Find the current in each bulb. Which bulb will consume more energy? 5

SECTION E

37. Read the following and answer the questions :

A student was asked to investigate what happens when a piece of shiny magnesium ribbon is added to copper sulphate solution. The apparatus was set up as shown below. The mass was recorded at the start and again after one hour.



1. Complete the equation:

Mg + CuSO4 →--------- + ---------

(a) MgSO4 + Cu (c) MgS + Cu2O

(b) MgO + Cu (d) Mg SO3 + Cu2O

2. Choose from below the name given to this type of reaction:

(a) Combustion (b) Displacement

(c) Corrosion (d) Electrolysis

3. Balance the following symbol equation that represents the displacement reaction that takes place between zinc and silver nitrate solution.

$Zn + AgNO_3 \rightarrow Zn(NO_3)2 + Ag$

(a) $Zn + 2AgNO_3 \rightarrow Zn(NO_3)2 + 2Ag$ (b) $Zn + 3AgNO_3 \rightarrow Zn(NO_3)2 + 3Ag$

(c) $Zn + 2AgNO_3 \rightarrow Zn(NO_3)2 + Ag$ (d) $2\ Zn + AgNO_3 \rightarrow Zn(NO_3)2 + Ag$

4. The experiment was repeated using sodium sulphate solution instead of copper sulphate solution. No reaction took place. Put the metals copper, magnesium and sodium in order of reactivity.

(a) I. Sodium II Copper III Magnesium (b) I Magnesium II Copper III Sodium

(c) I. Copper II. Magnesium III. Sodium (d) I. Sodium II. Magnesium III. Copper. 4

OR

Read the following and answer the questions:

A chemical reaction is a representation of chemical change in terms of symbols and formulae of reactants and products. There are various types of chemical reactions like combination, decomposition, displacement, double displacement, oxidation and reduction reactions. Reactions in which heat is released along with the formation of products are called exothermic chemical reactions. All combustion reactions are exothermic reactions.

1. The chemical reaction in which a single substance breaks down into two or more simpler substances upon heating is known as

(a) thermal decomposition reaction (b) photo decomposition reaction

(c) electric decomposition reaction (d) both (a) and (c)

2. The massive force that pushes the rocket forward through space is generated due to the

(a) combination reaction (b) decomposition reaction

(c) displacement reaction (d) double displacement reaction

3. A white salt on heating decomposes to give brown fumes and yellow residue is left behind. The yellow residue left is of

(a) lead nitrate (b) nitrogen oxide

(c) lead oxide (d) oxygen gas

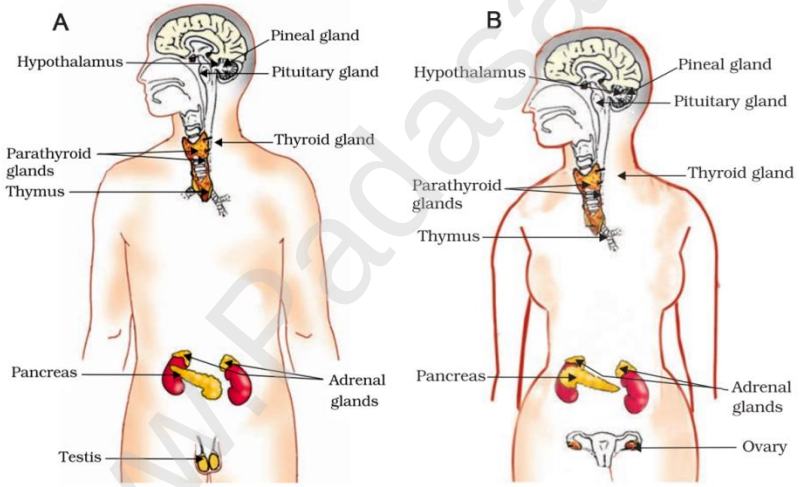
4. Which of the following reactions represents a combination reaction?

(a) $CaO\ (s) + H_2O\ (l) \rightarrow Ca(OH)_2\ (aq)$ (b) $CaCO_3\ (s) \rightarrow CaO\ (s) + CO_2(g)$

(c) $Zn(s) + CuSO_4\ (aq) \rightarrow ZnSO_4\ (aq) + Cu(s)$

(d) $2FeSO_4(s) \rightarrow Fe_2O_3\ (s) + SO_2(g) + SO_3(g)$ 4

38. Read the passage carefully and answer the questions given below.



A. Endocrine glands in human male

B. Endocrine glands in human female

A gland P is located just below the stomach in the human body. The gland P secretes a hormone Q. The deficiency of hormone Q in the body causes a disease W in which the blood sugar level of a person rises too much. person having high blood sugar is called X.

1. Name gland P.

a. Pancreas b. Adrenal c. Thyroid d. Hypothalamus

2.Name hormone Q.

a. Insulin b. Thyroxine c. Adrenaline d. Growth hormone

3.What is disease W?

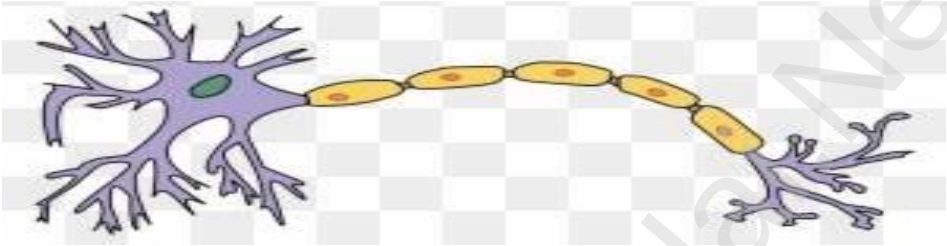
a. Diabetes b. Obesity c. Asthma d. Arthritis

4.Name the person X.

a. Obese person b. Diabetic person c. Cancerous person d. Asthmatic person 4

OR

Read the passage carefully and answer the questions given below.



The human body contains a large number of cells A which are very long and branched, and look like electric wires. The longest branch of this cell is B whereas there are many small branches C. Any two A cells do not join to one another completely in the human body. There is a microscopic gap D between every pair of adjacent A cells through which electric impulse can pass by the release of a chemical substance.

1. What are cells A?

a. neurons b. axon c. body cell d. dendrites

2. What is the name of (i) branch B, and (ii) branches C ?

a. synapse and neurons b. axon and body cell c. axon and dendrites d. none of these

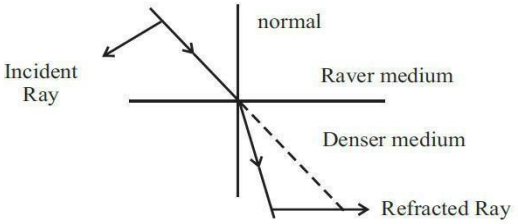
3. What is the microscopic gap D known as?

a. synapse b. fluid c. gap zone d. axon

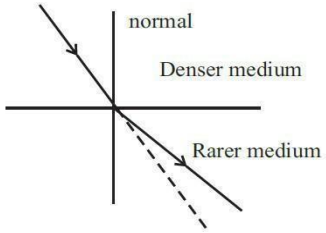
4. Which part of a neuron is responsible for receiving information?

a. axon b. terminal fibre c. dendrite d. body cell 4

39. The refractive index of a medium with respect to vacuum is called absolute refractive index of the medium. It is



When ray travel from Rarer to Denser it bends towards normal after refraction



When ray travel from denser to rarer medium it bends away from normal

given by, $\mu = \sin i/\sin r$

Absolute refractive indices of some of the materials A, B, C and D are given in the following table :

Medium	Refractive Index
A	1.54
B	1.33
C	2.42
D	1.65

1. How is absolute refractive index related to speed of light?

(a)$\mu = C/vm$ (b)$\mu=cvm$

(c)$\mu=Vm$ (d)$v\mu=c$

2. In which of the materials given in the above table, light travels fastest?

(a) A b) B

(c) C (d) D

3. The speed of light in air is 3x108 ms-1 and that in medium A is 2.5 x 10 ms-1. The refractive index of A will be

(a) 1.2 (b) 0.5

(c)4.5 (d)1.5

4. When light travels from air to glass,

(a) angle of incidence > angle of refraction

(b) angle of incidence < angle of refraction

(c) angle of incidence = angle of refraction

(d) Can't say 4

OR

Light is a form of energy which induces sensation of vision to our eyes. It becomes visible when it bounces off on surfaces and hits our eyes. The phenomenon of bouncing back of light rays in the same medium on striking a smooth surface is called reflection of light.

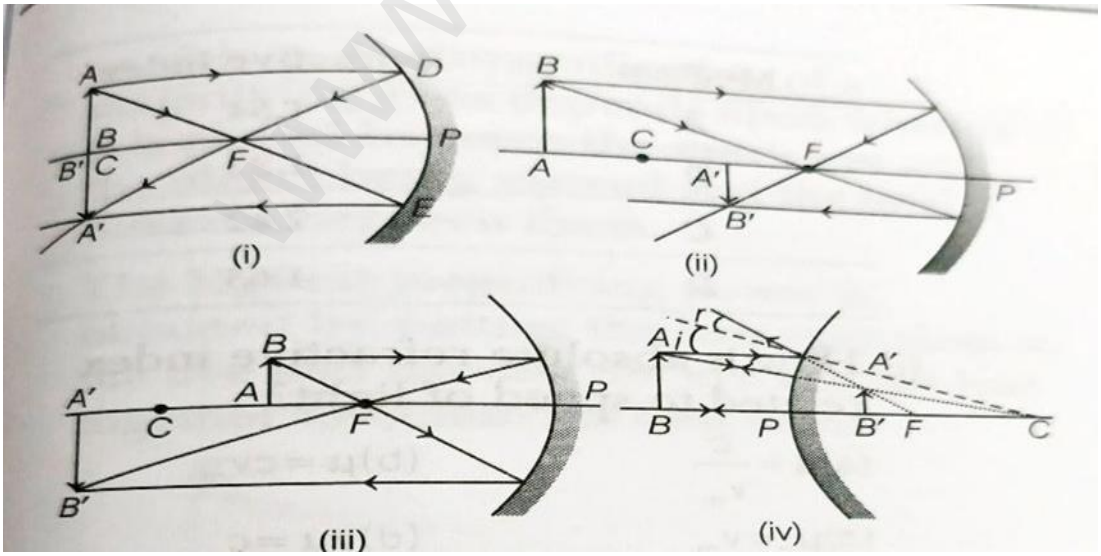
If parallel beam of incident rays remains parallel even after reflection and goes only in one direction is known as regular reflection. It takes place mostly in plane mirrors or highly polished metal surfaces. The mirror outside the driver side of a vehicle is usually a spherical mirror and printed on such a mirror is usually the warning "vehicles in this mirror are closer than they appear."

1. Which type of mirror is used outside the driver's side of a vehicle?
   (a) Plane mirror (b) Concave mirror
   (c) Convex mirror (d) Magic mirror

2. No matter how far you stand from a mirror, your image appears erect. The mirror can be

   (a) Plane (b) Concave
   (c) convex (d) Either plane or convex

3. Which of the following diagrams represents the image formation in above case?



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

4. If an object is placed at 10 cm from a convex mirror of radius of curvature 60 cm, then find the position of image.

(a) 4 cm (b) 7.5 cm (c) 10 cm (d) 12.5 cm 4