

CBSE X

MT EDUCARE LTD.

Set - A

SUBJECT : **SCIENCE**

Marks : 80

QUEST - I (Semi Prelim I)

Time : 3 hrs.

Date :

MODEL ANSWER PAPER

SECTION - A

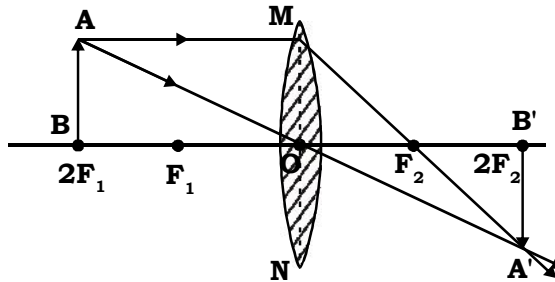
1. Grass → Grasshopper → Frogs → Snakes
(4000J) (400J) (40J) (4J)
So, for snakes and frogs, 4J and 40J energy will be available by the 10% law respectively.

1

2. (a) Pupil
(b) Retina

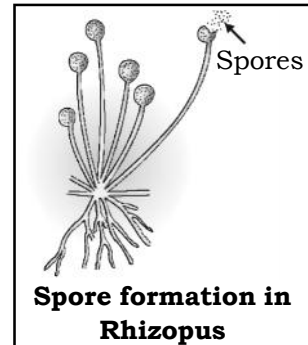
1

3. At $2F_1$ - The image formed is at $2F_2$, real, inverted and of same size as that of the object, as shown in Figure.



1

4. Spore formation in Rhizopus :
This is an asexual method of reproduction in bacteria and fungi. Spores are unicellular bodies formed by cell division in a parent organism. After detaching from the parent, and if conditions are suitable, they germinate, directly or indirectly and develop into a new individual.



2

5. The timing and amount of hormone released are regulated by feedback mechanisms. When the sugar level in blood rises, it is detected by the cells of pancreas. In response to this pancreatic cells produce more insulin to metabolise the increased sugar (glucose).
If the sugar level falls, pancreas cells reduce insulin secretion.

2

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| <p>6.</p> | <p>Ozone layer in the stratosphere is very helpful in shielding harmful UV rays. In absence of ozone layer heavy damage to the organism may occur. It may cause diseases like skin cancer, cataract, reduced crop production etc. The damage is limited by UNEP (United Nations Environment Programme), it has forged an agreement to freeze for CFC production in 1986. CFC - Chlorofluorocarbons are used as refrigerants and in fire extinguishers.</p> <p style="text-align: center;">OR</p> <p>6. (a) Pesticides kill insects and pests thereby protecting the crops but these pesticides remain on the crops which enter the food chain and gets accumulated in the organisms and reaches the top most trophic level causing diseases. When washed away by rain, it causes pollution of water. (b) Plastic bag is not broken down into simple components, as it cannot be acted upon by decomposers, so it is called non-biodegradable while paper gets decomposed.</p> <p>7. Digestion of fats takes place in the small intestine. Digestion of Fats : The fats are present in the form of large globules in the small intestine. Fats digesting enzymes are not able to act upon large globules efficiently. Bile juice secreted by the liver is poured in the intestine along with pancreatic juice. The bile salts present in the bile juice emulsify the large globules of fats. So, by emulsification large globules breakdown into fine globules to provide large surface area to act upon by the enzymes. Lipase enzyme present in the pancreatic juice causes breakdown of emulsified fats. Glands present in the wall of small intestine secrete intestinal juice which contains a fat-digesting enzyme that converts fats into fatty acids and glycerol. Small intestine is the region of digestion of fats.</p> <p>8. (a) Synapse (b) At the end of the axon, the electrical impulse sets off the release of some chemicals called neurotransmitter. These chemical across the gap or synapse, and start a similar electrical impulse in a dendrite of the next neuron. (c) Nerves (Peripheral nervous system).</p> <p>9. Myopia or short-sightedness : It is a vision defect in which a person can see nearby object clearly but cannot see the distant objects clearly beyond a certain point. This defect is common among children.</p> | <p style="text-align: right;">3</p> <p style="text-align: right;">2</p> <p style="text-align: right;">1</p> <p style="text-align: right;">3</p> <p style="text-align: right;">$\frac{1}{2}$</p> <p style="text-align: right;">1</p> <p style="text-align: right;">$\frac{1}{2}$</p> |
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| | <p>Cause of myopia : This defect arises due to either of the following two reasons :</p> <p>(i) The eyeball gets elongated along its axis so that the distance between the eye lens and the retina becomes larger.</p> <p>(ii) The focal length of the eye lens becomes too short due to the excessive curvature of cornea.</p> | 3 |
| 10. | <p>(a) A gas called hydrogen is evolved. Zinc granules appear corroded.</p> <p>(b) A precipitate of lead iodide settles down. The colour of the precipitate is yellow.</p> <p>(c) Reddish brown fumes of nitrogen dioxide are formed.</p> | 1 1 1 |
| | OR | |
| 10. | <p>(a) X = H₂, Y = Cl₂</p> <p>(b) $2\text{NaCl}_{(aq)} + 2\text{H}_2\text{O}(l) \xrightarrow{\text{Electrolysis}} 2\text{NaOH}_{(aq)} + \text{Cl}_{2(g)} + \text{H}_{2(g)}$</p> <p>(c) Bleaching powder is obtained when Y (Cl₂) is passed over slaked lime.</p> | 3 |
| 11. | <p>When the surface of a metal is attacked by air, water and some other substance, it is said to corrode. The phenomenon is known as corrosion.</p> <p>When iron is exposed to moist air for a long time, its surface acquires a coating of a brown, flaky substance. The brown surface easily peels off the iron surface, which if exposed further to moist air again acquires more of that brown layers. This is due to corrosion of iron in moist-air. The flaky substance formed is called rust. Rust is mainly hydrated ferric oxide, Fe₂O₃.xH₂O.</p> <p>Another example is copper metal. The surface of copper in moist air acquires a green coating of basic copper carbonate, Cu(OH)₂.CuCO₃.</p> | 3 |
| 12. | <p>(a) Magnesium ribbon burnt in air. $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$</p> <p>(b) $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$</p> <p>(c) SO₂ and SO₃</p> | 3 |

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| 13. | <p>The image formed in front of the concave mirror is real, so m is negative,</p> $m = -3, u = -10 \text{ cm}$ <p>As</p> $m = -\frac{v}{u} \quad \text{or} \quad -3 = -\frac{v}{-10} \quad \text{or} \quad v = -30 \text{ cm}$ <p>By mirror formula,</p> $\frac{1}{f} = \frac{1}{v} + \frac{1}{u} = \frac{1}{-30} + \frac{1}{-10} = -\frac{4}{30}$ $f = -\frac{30}{4} = 7.5 \text{ cm}$ <p>Radius of curvature, $R = 2f = 2 \times (-7.5) = -15 \text{ cm}$</p> | 3 |
| 14. | <p>The object placed at 25 cm from the correcting lens must produce the virtual image at 75 cm.</p> $\therefore u = -25 \text{ cm}, \quad v = -75 \text{ cm}$ $\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{-75} - \frac{1}{-25}$ $= -\frac{1}{75} + \frac{1}{25} = \frac{2}{75}$ <p>or</p> $f = +\frac{75}{2} \text{ cm} = +37.5 \text{ cm}$ $P = \frac{1}{f} = +\frac{100}{75/2} \text{ D} = +2.66 \text{ D.}$ | 3 |
| 15. | <p>Twinkling of stars : The apparent position of a star is slightly different from the actual position due to refraction of starlight by the atmosphere. Further, this apparent position is not stationary but keeps on changing due to the change in atmospheric conditions like density, temperature, etc. The path of the rays of light coming from the star goes on varying slightly. The amount of light entering our eyes from a particular star increases or decreases randomly with time. Sometimes, the star appears bright and other times, it appears fainter. This gives rise to the twinkling effect of the star.</p> <p>The planets do not show twinkling effect :</p> <p>As the planets are much closer to the earth, the amount of light received from them is much greater and the fluctuations caused in the amount of light due to atmospheric refraction are negligible as</p> | |

16. (a) (i) SI unit of power is dioptre (D). One dioptre is defined as the power of a lens whose focal length is 1 metre.

$$f = 1\text{m}$$

$$P = \frac{1}{1\text{m}} = 1\text{m}^{-1} = \mathbf{1\text{dioptre (D)}}$$

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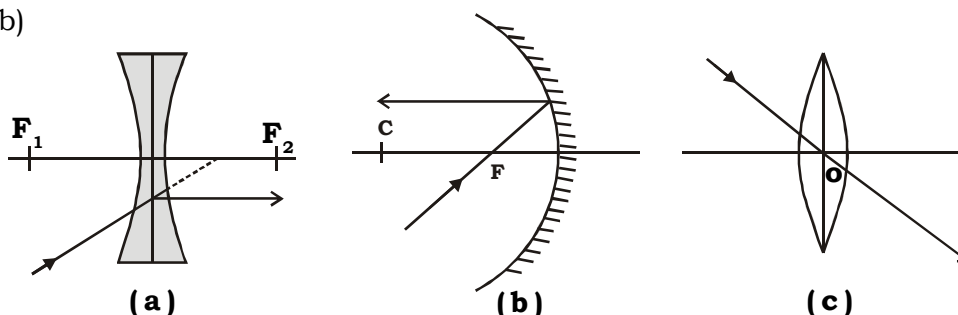
(ii) As the focal length is negative, so the lens is concave.

Here, $f = -50\text{ cm} = -0.50\text{ m}$

$$\therefore \text{Power, } P = \frac{1}{f \text{ (in m)}} = \frac{1}{-0.50\text{ m}} = -2\text{D}$$

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(b)



3

OR

16. (i) **Range of normal vision** : Due to accommodation property of the lens, a normal eye can clearly see the objects situated anywhere between infinity and 25 cm from it. At distance less than 25 cm., the ciliary muscles cannot bulge the eye lens any more, the object cannot be focused on the retina and it appears blurred to the eye, as shown in figure. The distance between infinity and 25 cm point is called the range of normal vision.

(ii) **Least distance of distinct vision** : The minimum distance from the eye, at which the eye can see the objects clearly and distinctly without any strain is called the least distance of distinct vision. For a normal eye, its value is 25 cm.

(iii) **Near point** : The nearest point from the eye, at which an object can be seen clearly by the eye is called the near point of the eye. The near point of a normal eye is at a distance of 25 cm.

(iv) **Far point** : The farthest point from the eye, at which an object can be seen clearly by the eye is called the far point of the eye. For a normal eye, the far point is at infinity.

(v) **Power of accommodation** : The power of accommodation of the eye is the maximum variation of its power for focusing on near and far (distant) objects.

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| 17. | <p>(a) For a given conc. of hydrochloric acid and acetic acid, hydrochloric acid gives more no. of H⁺ ions whereas acetic acid gives less no. of H⁺ ions. Hydrochloric acid will give deep red colour with universal indicator and acetic acid gives orange red colour.</p> <p>(b) A substance that absorbs moisture gradually from air and becomes a liquid (solution) is called deliquescent and this phenomenon is known as deliquescence.</p> <p>(c) Water of crystallization is the fixed number of water molecules present in one formula unit of a salt. For example, chemical formula of hydrated copper sulphate is CuSO₄.5H₂O. Copper sulphate has 5 molecules of water of crystallization. Sodium carbonate (Na₂CO₃.10H₂O) contains ten molecules of water of crystallization.</p> | <p>2</p> <p>1</p> <p>2</p> |
| 18. | <p>(a) (i) A convex mirror is preferred as a rear-view mirror because → It always forms an erect, virtual and diminished images of an object placed anywhere in front of it. → It has wider field of view.</p> <p>(ii) A concave mirror is preferred as a shaving mirror because when it is held closer to the face, it forms → an enlarged images of the face → an erect image of the face</p> <p>(b) (i) A concave mirror has a real focus. (ii) A convex mirror has virtual focus.</p> | <p>3</p> <p>2</p> |
| 19. | <p>Double circulation : In human beings, the blood goes through the heart twice during each cycle. This is called circulation. The double circulation of blood includes :</p> <p>(i) Systemic circulation : It supplies oxygenated blood from left auricle to left ventricle thereby pumped to various body parts, through aorta. The deoxygenated blood is collected from the various body organs by the veins to pour into superior and inferior vena cava and finally towards right atrium (auricle). Right atrium transfers the blood into the right ventricle.</p> <p>(ii) Pulmonary circulation : The deoxygenated blood is pushed by the right ventricle towards the lungs for oxygenation through pulmonary artery. The oxygenated blood is brought back to left atrium of the human heart by the pulmonary veins.</p> <p>Necessity of double circulation : The separation of the right side of the human heart is useful to keep deoxygenated and oxygenated blood from mixing. This type of separation of oxygenated and deoxygenated blood ensures a highly efficient supply of oxygen to the body. This is useful in case of humans which constantly require energy to maintain their body temperature.</p> | <p>1</p> <p>1½</p> <p>1</p> <p>1½</p> |

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| 20. | (a) (i) Ions (ii) Anions (iii) Cations. | 3 |
| | (b) (i) Aluminium when exposed to air forms a protective coating of aluminium oxide on its surface which is not the case in iron. (ii) Solder easily melts and is used to weld electrical wire together. | 2 |
| 21. | (a) Testes : Form the male gametes the sperms and secrete the male sex hormone testosterone. | 1 |
| | (b) Ovaries : Form the female gamete ovum or the egg cell and secrete the female sex hormones estrogen and progesterone. | 1 |
| | (c) Vas deferens : Transport the sperms from the testes to the exterior. | 1 |
| | (d) Stamen : Form the pollen grains in flowers. The pollen grains bear the male gametes. | 1 |
| | (e) Pistil : The ovary forms the egg and the stigma helps in attracting the pollen grains for fertilisation. | 1 |
| SECTION - B | | |
| 22. | (a) Copper is more active than silver so when copper wire is dipped in silver nitrate, it displaces silver and copper nitrate is formed. The colour of copper nitrate is bluish green. | 1 |
| | (b) $\text{Cu} + 2\text{AgNO}_3 \longrightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$ Bluish green | 1 |
| 23. | (a) Calcium sulphate hemihydrate | 1 |
| | (b) Galvanisation is a process of protecting steel and iron from rusting by coating them with a thin layer of zinc. | 1 |
| 24. | (a) The person is suffering from both myopia and hypermetropia. | |
| | (b) The person requires bi-focal lenses to increase his range of vision. The upper part of the bi-focal lens is a concave lens which facilitates distance vision while the lower part is a convex lens which facilitates near vision. | 2 |
| 25. | (i) The function of stomata is to exchange gases between the plant and the atmosphere. | 1 |

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| | <p>(ii) Reasons :</p> <p>(a) It helps in the upward movement of cell sap.</p> <p>(b) It helps in the removal of excess water in plants.</p> | <p>1</p> |
| <p>26.</p> | <p>Cytokinins</p> <p>Other hormones :</p> <p>(i) Gibberellins - help in elongation of stem.</p> <p>(ii) Absciscic acid - prevents growth and causes wilting of leaves.</p> | <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> |
| <p>27.</p> | <p>The reason for decline of female-male sex ratio is sex-selective, abortion of female foetuses. Because of reckless female foeticides, child ratio is declining at alarming rate in some sections of our society.</p> <p>Measures :</p> <p>(i) Prenatal sex determination should be strictly prohibited by law.</p> <p>(ii) Strict law to prevent abortion of female foetuses.</p> <p>(iii) Educating the people to understand importance of girls in the society.</p> | <p>1</p> <p>1</p> |
| <p>❖❖❖❖❖</p> | | |