CENTRAL BOARD OF SECONDARY EDUCATION

SAMPLE PAPER

CLASS 10

2024

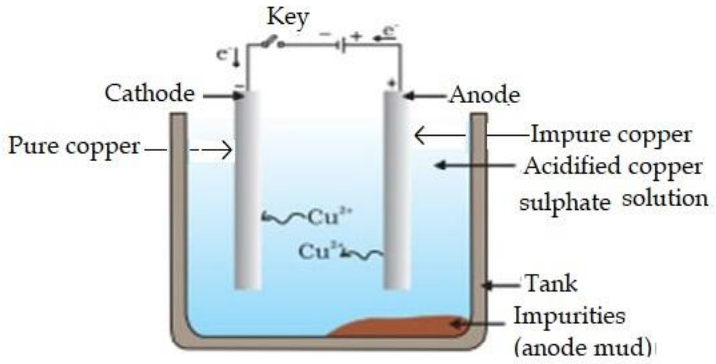
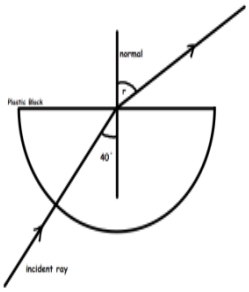


Solutions

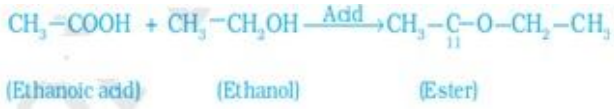
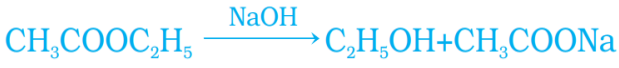
Marking Scheme (2023-24)
Class-X
Science (Subject Code – 086) 6

Q. No.	Answer	Marks
	Section–A	
1	b) Barium sulphate	1
2	b) Colourless	1
3	d) $NaHCO_3$	1
4	a) Sodium	1
5	b) $2Na^{+}\left[\cdot\overset{\cdot\cdot}{O}\cdot\right]^{-2}$	1
6	d) 11 (2,8,1)	1
7	c) 14	1
8	b) Mushroom	1
9	a) tongue	1
10	c) Vegetative propagation	1
11	c) Growth hormones under the influence of the enzymes coded by a gene.	1
12	c) lack of oxygen and formation of lactic acid.	1
13	d) behind the mirror and its position varies according to the object distance.	1
14	c) scattering of light.	1
15	c) CFCs, Ozone	1
16	a) Broken down by biological processes	1
17	d) Assertion is false but Reason is true	1
18	a) Both A and R are true and R is the correct explanation of A.	1
19	d) Assertion is false but Reason is true	1
20	c) A is true but R is false.	1
	Section–B	
21	Response with any of the given two arguments. [1+1] • Bubbles of gas/ Evolution of gas • Change in colour (Zn - silvery grey to black) • Change in temperature	2
22	• After fertilisation, the zygote divides several times to form an embryo within the ovule. • The ovule develops a tough coat and is gradually converted into a seed. • The ovary grows rapidly and ripens to form a fruit. • The petals, sepals, stamens, style and stigma may shrivel and fall off. [0.5x4=2]	2
23	To filter out nitrogenous waste products like **urea and uric acid** [0.5] **from the blood** [0.5] in humans. Organ for storage: Urinary Bladder [0.5] Organ for release: Urethra [0.5] **OR** The blood emerges from the heart under high pressure and flows through arteries. Hence, to bear this pressure the arteries have thick and elastic walls. [1] -Veins have valves to ensure that the blood flows in one direction only. [1]	2

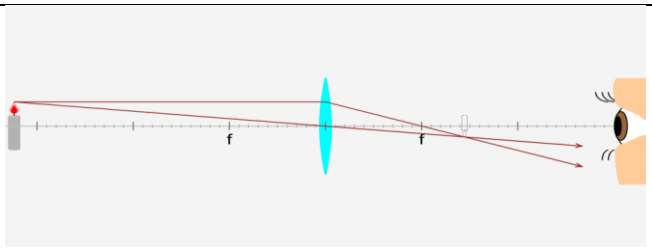
24	a) When light travels from an optically rarer medium to an optically denser medium it moves towards the normal. Since $n_B > n_A$ hence the light ray will bend towards the normal on passing from medium A to B. [0.5+0.5] b) The speed of the light will increase when the light travels from B to C, Since $nc<n_B$ and v=(c/n), the speed of light ray will increase in the second medium. [0.5+0.5]	2
25	Resistance of each part is $\frac{R}{3}\ \Omega$ (as resistance is proportional to the length of the wire.) [0.5] $\frac{1}{R_1} = \frac{3}{R} + \frac{3}{R} + \frac{3}{R} = \frac{9}{R}$ [1] $\therefore R_1 = \frac{R}{9}\ \therefore \frac{R_1}{R} = \frac{1}{9}$ [0.5] **OR** The magnetic field strength is more in the region where the field lines are crowded. This means the field strength is maximum near the poles and it reduces as we go away from the poles. [0.5+0.5] The direction of the magnetic field is also reversed. [1]	2
26	a) 10000J because only 10 % of energy is available for the next trophic level. b) No, since the loss of energy at each step is so great that very little usable energy will remain after 4 trophic levels.	2
	Section–C	
27	a) The above reaction is known as a ***thermite reaction*** as the reaction is highly exothermic reaction. **OR** the metal (Mn/Fe) obtained will be in molten/ liquid state. [1] b) Substance oxidised - Al(s) [0.5] Substance reduced – MnO_2 (s) [0.5] c) Aluminium is preferably used in thermite reactions as it is placed above Fe and Mn in reactivity series of metals. [1] **OR** Al is more reactive than Fe/ Mn	3
28	MCl_3 ; $M_2(SO_4)_3$ [1] M in general forms Ionic bond. It can acquire a stable electronic configuration of neon (2, 8) by losing its three valence electrons to form M^{3+}cation. [1] Compounds formed will conduct electricity in liquid / molten state but not in solid state in contrast to 'M' [1] **OR** a) 'X' - Copper/ Cu and 'Y' - CuO [1] b) Diagram to represent the process of refining of 'X [2]	3

		
29	- Iodine is essential for the synthesis of thyroxin hormone. - Thyroxin regulates carbohydrate, protein and fat metabolism in the body. - Thyroxin provide best balance for growth in the body.	3
30	There are 50% chances that a girl may be born and 50% chances that a boy may be born. [1] It can be explained as follows: Most human chromosomes have a maternal copy and a paternal copy. We have 22 such chromosomes. One pair of chromosomes called sex chromosomes is odd in not always being a perfect pair. Women have a perfect pair of sex chromosomes, both called X. (XX) [0.5] But men have a mismatched pair of sex chromosomes in which one is normal sized – X chromosome while the other is a short one called Y chromosome. (XY) [0.5] A child receives one chromosome from mother which is essentially X chromosome. [0.5] A child who inherits an X chromosome from her father will be a girl, and one who inherits a Y chromosome from him will be a boy. [0.5].	3
31	i. The refractive index of a medium with respect to air is given by $\frac{speed\ of\ light\ in\ air}{speed\ of\ light\ in\ the\ medium}$. Since speed of light in the medium is always less than the speed of light in air, hence the above ratio is always greater than 1. [0.5+0.5] ii. The ray of light is undergoing normal incidence at the air-plastic block interface. And for normal incidence there is no deviation. [1] iii. [0.5+0.5]  (Credit arrows, refracted ray moving away from normal)	3
32	i. Joules law of heating states that the heat dissipated across a resistor is directly proportional to [0.5 for naming only] (a) the square of the current flowing through it	3

	(b) The resistance of the conductor (c) duration of flow of current. [1.5] H= 1^2Rt (alternative answer). ii. Resistance of a conductor depends on (a) the length of the conductor (b) the area of the cross section (c) nature of material (d) temperature of the conductor. (Any two should fetch full marks). [0.5+0.5]	
33	(i) Anannya's answer is wrong. Electrical appliances with metallic bodies need an earth wire which provides a low resistance conducting path to the flow of current, in case there is an accidental leakage of current through the conducting body of the appliances. [1+1] (ii) An electrical fuse is a safety device that operates to provide protection against the overflow of current in an electrical circuit. An important component of an electrical fuse is a metal wire or strip that melts when excess current flows through it. [1]	3
	Section–D	
34	a) Rehmat's observation is correct as the hydrogen atoms are substituted by hetero atom i.e., Cl [1] $CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$ (in the presence of sunlight) **OR** Any other relevant equation in the chain reaction $2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$ **OR** **$NaCl \rightarrow Na^+ + Cl^-$** **$2Cl^- \rightarrow Cl_2 + 2e^-$(At anode)** **$H_2O \rightarrow H^+ + OH^-$** **$2H^+ + 2e \rightarrow H_2$ (At cathode)** **$Na^+ + OH^- \rightarrow NaOH$** [2] b) Sodium hydroxide/ NaOH/ Caustic soda [1] Hydrogen - ½ Uses: (any one each) [1] Sodium hydroxide/ NaOH/ Caustic soda - Degreasing of metals - Preparation of soaps and detergents - Paper making - Artificial fibres Hydrogen - - Fuels - Margarine	5

	- Manufacture of ammonia for fertilizers **OR** X - Ethanoic acid/ acetic acid/ CH_3COOH Y - Ethanol/ Ethyl alcohol/ C_2H_5OH Z - Ethyl ethanoate/ Ester – $CH_3COOC_2H_5$ [1 x 3]  [1]  [1]	
35	a) Sperm formation will be adversely affected because it requires a lower temperature than the body temperature. b) Vas deferens is a passage for transfer of sperms, so sperms will not be transferred further. c) When prostate and seminal vesicles are not functional, they will not add secretions for nourishment and medium for the transport of sperms. d) When an egg is not fertilised in a human female, it lives for about one day. Then, the thickened lining of the uterus breaks leading to discharge of blood and mucus along with the unfertilised egg. This is called menstruation. e) Nutrition and oxygen will not be provided to the growing embryo affecting its growth, which could have serious implications as well. **OR** a) - Sameer is suffering from diabetes - Insulin - Pancreas b) - Cytokinins - Abscisic Acid	5
36	(i) Convex lens [1] (ii) $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ In this case, v= 7m and f=5m. Putting the values in the equation we get - $$\frac{1}{5} = \frac{1}{7} - \frac{1}{u}$$ $$\frac{1}{u} = \frac{1}{7} - \frac{1}{5} = \frac{5-7}{35} = \frac{-2}{35}$$ $$u = -\frac{35}{2} = -17.5\ m$$ The object will be placed 17.5 m on the left of the convex lens. [0.5 x 4]	5

(iii)



(two rays, arrows, object placed beyond 2f on the left) [2]

OR

(i) $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ where $u = -5cm, f = \frac{r}{2} = -20cm$

$$-\frac{1}{20} = \frac{1}{v} - \frac{1}{5}$$

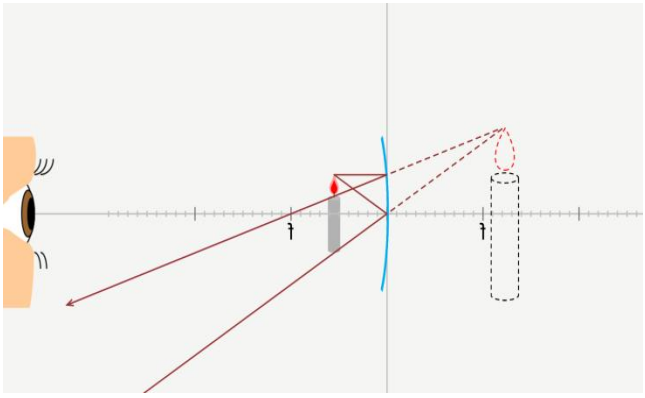
$$\frac{1}{v} = -\frac{1}{20} + \frac{1}{5} = \frac{-1+4}{20} = \frac{3}{20}$$

$$v = \frac{20}{3} = 6.67\,cm$$ [0.5 x 4]

The image is obtained at 6.67m behind the mirror.

(ii) m $= \frac{h_2}{h_1} = -\frac{v}{u} = \frac{\frac{20}{3}}{5} = \frac{4}{3}$ [0.5+0.5]

(iii)

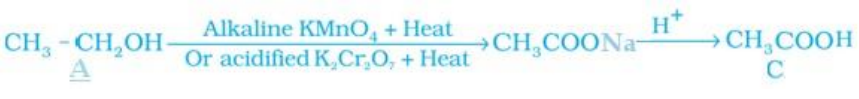


(two rays, arrows, object placed between pole and the focus) [2]

Section–E

37

a) A - Ethanol; F - Ethene [2]



[2]

b)



OR

Oxidation, Addition/ Hydrogenation

Propanol, Propene

4

38

a) Free ear lobe is dominant because it is found in a large majority of the population. (1)

b) No. It is not sex linked. As per the data of the family as well as the class, it is indicated that free ear lobe is present in males as well as in females. (1)

c) Father – Ff (free ear lobe), Mother – Ff (free ear lobe), Rahul – ff (attached ear lobe) and

4

	Nisha – Ff (free ear lobe) (1/2 x 4 = 2) **OR** Suresh's father – ff (attached ear lobe), mother – ff (attached ear lobe), Suresh - ff (attached ear lobe), Siya – ff (attached ear lobe). If both parents have recessive character, then all the children can have recessive character only.	
39	(i) 12 Ω lamps (only) on. (a) 4 Ω lamps (only) on [0.5+0.5] (ii) 12 V for both sets of lamps and all of them are in parallel. [1] (iii) 12 Ω lamps are on when the wire is connected to position 2. Voltage across both 12 Ω lamps = 12 V. V=IR (Ohm's law). $I = \frac{V}{R} = \frac{12}{12}$ = 1A. [1] 4 Ω lamps are on when the wire is connected to position 3. Voltage across both 4 Ω lamps = 12 V. V=IR (Ohm's law). $I = \frac{V}{R} = \frac{12}{4}$ = 3A. [1] **OR** $P = V^2/R$ All lamps are in parallel and hence same V for all lamps. For 4 Ω lamps → $P = \frac{12 \times 12}{4} = 36\ W$ For 12 Ω lamps → $P = \frac{12 \times 12}{12} = 12\ W$ Hence 4 Ω lamps will have higher power. [0.5 x 4]	4

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