COMMON PRE-BOARD EXAMINATION

SCIENCE Code No. 086
CLASS-X-(2025-26)

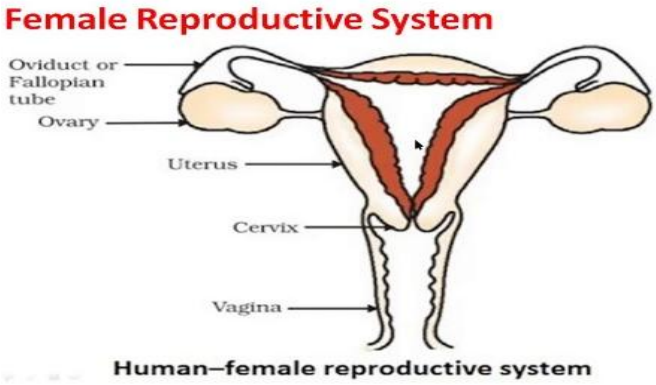
SET: 2

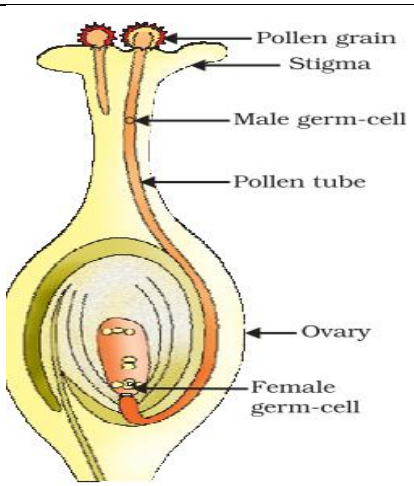
Marking scheme

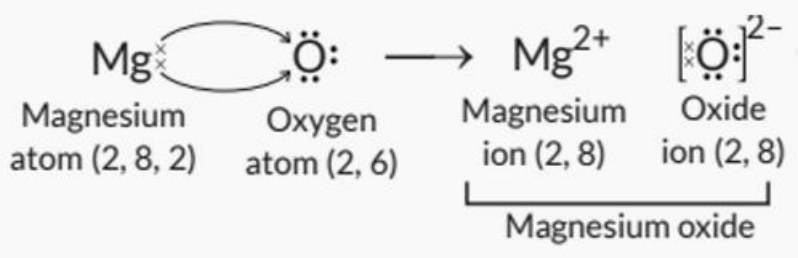
Section – A		MARKS
1	A. Decrease in energy at higher trophic levels	1
2	B. Anaerobic respiration increases due to a lack of oxygen, leading to lactic acid accumulation.	1
3	C. Y is always lower than Z	1
4	C. Posture and balance of the body are not maintained.	1
5	A. 10% law of energy	1
6	A. 25%	1
7	C. Insufficient growth of the body	1
8	C. A is true R is false	1
9	C. A is true, but R is false.	1
10	i) Two substances present in region 2 but not in region 4: Substances Glucose, Amino acids. These substances are reabsorbed from the filtrate in the tubules (mainly the proximal convoluted tubule) back into the blood because they are useful and essential for the body. Hence, they do not appear in the final urine in region 4. The capillary cluster is called the glomerulus. Working with region 2 (Bowman's capsule): • The glomerulus is a network of capillaries enclosed by Bowman's capsule (region 2). • Blood enters the glomerulus through the afferent arteriole and leaves through the efferent arteriole. • Due to high blood pressure in the glomerulus, ultrafiltration occurs — water, salts, glucose, urea, and amino acids are	2

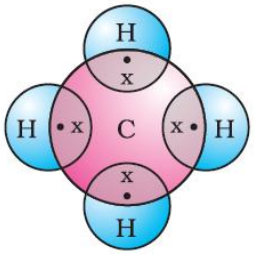
	filtered out from the blood into Bowman's capsule, forming the glomerular filtrate (present in region 2). • This filtrate then passes through the nephron tubule, where reabsorption and secretion occur, leading to the formation of urine collected in region 4.	
11	A. Presence of respiratory pigment (haemoglobin): Oxygen binds readily with haemoglobin present in red blood cells to form oxyhaemoglobin. High solubility of carbon dioxide in plasma: Carbon dioxide is more soluble in blood plasma than oxygen. OR B. i)The substance is Hydrochloric acid (HCl). Overproduction of HCl lowers the pH of gastric juice excessively, leading to acidity, heartburn, or irritation in the stomach lining. ii) Importance of HCl production: HCl is essential for digestion because it: 1. Activates the enzyme pepsin from its inactive form, to begin protein digestion. 2. Kills harmful bacteria and pathogens present in food. 3. Provides an acidic medium necessary for enzyme activity in the stomach. (any two)	1+1=2
12	i) The phenomenon is called *biological magnification* (or biomagnification). ii) Effect on organisms at different trophic levels: • As DDT moves up the food chain, its concentration increases at each trophic level because it is not easily broken down or excreted. • Producers (aquatic plants) absorb small amounts of DDT from water. • Primary consumers (small fish) eat many plants, accumulating more DDT. • Secondary consumers (larger fish) eat several smaller fish, leading to a higher concentration. • Tertiary consumers (herons) receive the highest concentration of DDT, which affects their physiology — in this case, thinning of eggshells, leading to reduced reproduction and population decline.	½ x4=2
13	(i) Mendel studied dihybrid cross involving two traits — for example,	1+1+1=3

	• Seed shape: Round (R) and Wrinkled (r) • Seed colour: Yellow (Y) and Green (y). They represent themselves as RRYY, RrYy, rryy, etc. (ii) The F_1 generation plants were Round and Yellow — showing the dominant traits. (iii) The 9: 3: 3: 1 ratio in F2 generation suggests Mendel's Law of Independent Assortment, which states that alleles of different genes assort independently during gamete formation.	
14	i) Stimulus: Touch (mechanical stimulus) — the leaves respond when touched. Cause of rapid movement: The folding and drooping of leaves in Chhui-mui (Mimosa pudica) is caused by, plant cells change shape by changing the amount of water in them, resulting in swelling or shrinking, and therefore in changing shapes, not by growth. (ii)The impulse travels from the dendrite to the cell body, and then along the axon to its end. At the end of the axon, the electrical impulse sets off the release of some chemicals. These chemicals cross the gap, or synapse, and start a similar electrical impulse in a dendrite of the next neuron. This is a general scheme of how nervous impulses travel in the body.	1.5+1.5 =3
15	A. Blood vessel (A): Pulmonary artery supplies deoxygenated blood to the lungs for oxygenation. Characteristic features of arteries (any two): 1. Thick, muscular walls to withstand high pressure. 2. Narrow lumen compared to veins. 3. Carry blood away from the heart. OR B.(i) The interventricular and interatrial septa prevent mixing of the two types of blood. (ii) This ensures efficient oxygen supply to body tissues, maintaining high metabolic rate required for temperature regulation in warm-blooded animals. C. Left ventricle, receives oxygenated blood from the left atrium. Pumps oxygenated blood into the aorta for systemic circulation (to the entire body). D. Pulmonary vein-oxygenated blood	4
16	i) The human male reproductive organ that produces sperm and secretes a hormone is the testis (plural: testes). The primary hormone it secretes is testosterone. The functions	1+2+2=5

	of testosterone include causing the development of male secondary sexual characteristics and sperm production. ii) The fusion of the egg and sperm occurs in the fallopian tube (oviduct), while the zygote implants in the uterus.  Human–female reproductive system (1 mark for drawing + I mark for labelling) iii) The embryo receives nourishment from the mother's blood through a specialized organ called the placenta. The placenta connects to the embryo via the umbilical cord and transfers oxygen and nutrients like glucose from the mother's blood to the embryo's blood. Waste products, such as carbon dioxide, also move from the embryo's blood to the mother's blood to be eliminated by her body. OR i) Self-pollination is the transfer of pollen from the anther to the stigma of the same flower or another flower on the same plant, while cross-pollination is the transfer of pollen between flowers of different plants of the same species. (1 mark) Fertilisation, the fusion of male and female gametes, occurs in the ovary of the flower, and the product of this fusion is the zygote, which develops into a new plant. (1 mark) ii)	

	 (2 mark)	
	Section – B	
17	A. PbI_2	1
18	A. A clear and transparent solution is formed	1
19	A.Thermal decomposition of lead nitrate which produces brown fumes of nitrogen dioxide.	1
20	B. Al and Al_2O_3	1
21	C. A is a saturated cyclic hydrocarbon and B and C are unsaturated cyclic hydrocarbons.	1
22	C. (i), (ii) and (iv)	1
23	D. Formation of bubbles of a colourless and odourless gas.	1
24	D. A is false, but R is true.	1
25	(a) The colour of the ferrous sulphate solution will remain the same as test tube I in test tube II (with copper), because copper is less reactive than iron and cannot displace it from its solution. (b) The colour of the ferrous sulphate solution will fade and a black mass will be deposited in test tube III (with zinc) and test tube IV (with aluminium) because both metals are more reactive than iron and will displace it from the solution.	2 (1+1)
26	A. At the cathode: Hydrogen gas (H_2) is liberated. At the anode: Oxygen gas (O_2) is liberated B. $2H_2O(l) \rightarrow 2H_2(g)+O_2(g)$ 2 molecules of hydrogen gas are produced for every 1 molecule of oxygen gas. Therefore, the volume of hydrogen gas collected at the cathode is twice the volume of oxygen gas collected at the anode. C. The circuit may not conduct electricity effectively. Dilute H_2SO_4 increases the conductivity of water by providing free ions, which help carry the current.	3
27	Attempt either option A or B.	3

	A. (i) Atomic number of magnesium (Mg) = 12 Its electronic configuration=2, 8, 2 Atomic number of oxygen = 8 Electronic configuration of oxygen = 2, 6 (ii) Properties of MgO are: (a) It is soluble in water. (b) It has high melting point due to strong electrostatic forces of attraction between Mg^{2+} and O^{2-} ions or any two properties of ionic compound. (iii)  OR B. (i) Carbonate ore. Zinc carbonate (ii) Calcination: $ZnCO_3 \rightarrow ZnO + CO_2$ Reduction: $ZnO + C \rightarrow Zn + CO$ (iii) Calcium reacts with water to form calcium hydroxide and hydrogen gas. The bubbles of hydrogen gas produced stick to the surface of calcium and hence, it starts floating on the surface of water.	
28	A. Incorrect value - water Correct pH of pure water is 7. B. Sodium hydrogen carbonate ($NaHCO_3$) is formed from a strong base (NaOH) and a weak acid (H_2CO_3). When sodium hydrogen carbonate is heated, it decomposes to form sodium carbonate (washing soda). $2NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$ $Na_2CO_3 + 10\ H_2O \rightarrow Na_2CO_3 .10H_2O$ OR Gas evolved: Carbon dioxide (CO_2) Test for CO_2 gas: • Pass the gas through lime water • If it turns milky, the gas is CO_2. C. (iv) De-greasing metals	4
29	<u>Attempt either option A or B.</u> A.	5

	(i) Compounds A, B and C are: A → Ethanol B → Ethene C → Ethane (ii) $CH_3CH_2OH \xrightarrow{\text{Hot Conc. } H_2SO_4} CH_2 = CH_2 + H_2O$ (iii) When ethane undergoes combustion, carbon dioxide is produced along with water and heat. $2C_2H_6 + 7O_2 \longrightarrow 4CO_2 + 6H_2O + \text{Heat}$ (iv) In industry, hydrogenation reaction is used for preparing vegetable ghee from vegetable oils. (v) Sodium ethoxide and Hydrogen $2Na + 2CH_3CH_2OH \rightarrow 2CH_3CH_2O^-Na^+ + H_2 \uparrow$ OR B. (i) Methane  (ii) Covalent bonds (iii) CNG and bio-gas (iii) Homologous series: Alkanes General formula: C_nH_{2n+2} (iii) A clean blue flame	
	Section – C	
30	C. Device 'X' is a concave mirror of focal length 12 cm.	1
31	B. A bright white light again	1
32	C. A is true, but R is false.	1
33	<u>Attempt either option A or B.</u>	

A.

(i) In the given circuit, all resistors are connected in series so equivalent resistance, R is given by

$$R = R_1 + R_2 + R_3$$
$$= 1 + 3 + 2 = 6\,\Omega$$

Also, voltage $V = 3$ Volt

So, $I = \frac{V}{R} = \frac{3}{6} = \frac{1}{2}$ A

Reading of ammeter will be 0.5 A. ½ + ½

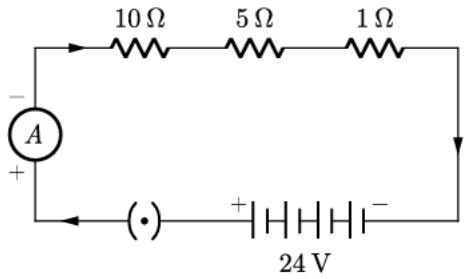
(ii) and $V = IR = 0.5 \times 1 = 0.5$ V

Reading of voltmeter will be 0.5 V. ½ + ½

OR

B.

(i)



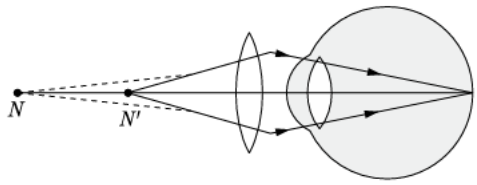
1

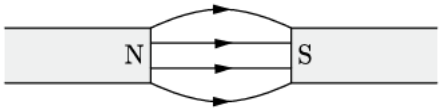
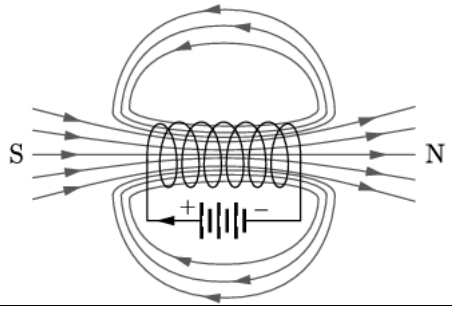
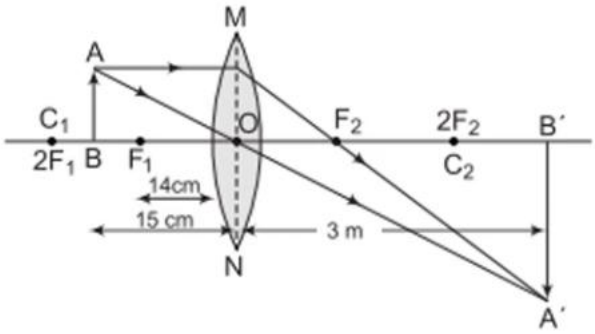
(ii)

$$R = 10 + 5 + 1$$
$$= 16\,\Omega$$
$$V = 24 \text{ Volt}$$

$$I = \frac{V}{R}$$
$$= \frac{24}{16} = \frac{3}{2}$$
$$= 1.5 \text{ A}$$

½ + ½

34	Real image means the mirror is concave. $v = -18\,\text{cm}$ $m = -\frac{1}{5} = \frac{-(-18)}{u}$ $u = -90\,\text{cm}$ Using the mirror formula, $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $= \frac{1}{-18} + \frac{1}{-90}$ $= \frac{5+1}{-90}$ $= \frac{6}{-90}$ $f = \frac{-90}{6} = -15\,\text{cm}$	½ ½ ½ ½
35	(i) Name of the defect is hypermetropia because far point is situated at infinity but the near point has shifted away from 25cm. (ii) Causes of hypermetropia: (a) Focal length of eye lens is too long. (b) Eye ball has become too small. (iii) Convex lens of suitable focal length is required to correct this defect. Diagram for correction:  	½ + ½ ½ + ½ 1
36	Physical conditions remaining same, the electric current flowing through a conductor is directly proportional to the potential difference across the two ends of the conductor. I α V Given, Radius of the wire, $r = \frac{d}{2}$ $= \frac{0.5}{2} = 0.25\,\text{mm} = 0.025\,\text{cm}$ and its resistance $R = \rho\frac{l}{A}$ $l = \frac{RA}{\rho} = \frac{R\pi r^2}{\rho}$ $= 10 \times \frac{22}{7} \times \frac{(0.025)^2}{1.6 \times 10^{-6}}$ $= 122.67\,\text{cm}$	1 ½ ½ ½ ½
37	(i) If two field lines intersect each other, at the point of	1

	intersection, two tangents with two directions of the magnetic field can be drawn. This is not possible. (ii)  (iii)  	1 1
38	A. Convex (converging) lens. B. Negative as the image is real and inverted. <u>Attempt either subpart C or D.</u> C. 1/f = 1/v – 1/u Identifying f= 20 cm and u = -21 cm 1/20 = 1/v – 1/-21 v= 420 cm OR D.  Mention focal length, object and image distance in the diagram.	1 ½ +½ ½ ½ ½ ½ 1 ½ ½
39	<u>Attempt either option A or B.</u> A. (i) R_3 and R_4 in parallel $R^1 = R_3 R_4 / R_3 + R_4$	 ½

	$R^1 = 30(60)/ 30+60 =20\ \Omega$.	½
	$R= R_1 + R_2+R^1$	½
	$= 10+20+20$	
	$R = 50\ \Omega$	½
	(ii) According to Joule's law of heating, the heat produced in a wire is directly proportional to	1
	(i) square of current (I^2),	
	(ii) resistance of wire (R),	
	(iii) time (t) for which current is passed.	
	Thus, the heat produced in the wire by current (I) in time (t) is	
	$H = I^2Rt$	½ + ½
	Explanation of each term	
	(iii) For an electric iron which consumes 1 kW electric power when operated at 220 V, a current of (1000/220) A, i.e., 4.54 A will flow in the circuit. In this case, a 5 A fuse must be used.	1
	OR	
	B.(i) 4 Ω and 2 Ω in series	
	$R^1= 4+2$	½
	$R^1= 6\ \Omega$	½
	2 Ω, 3 Ω and R^1 are in parallel	
	$1/R = 1/R_1+1/R_2+1/R^1$	½
	$R = 1\ \Omega$	½
	(ii) Energy consumed by electric heater,	
	$E= P(t)$	½
	$= 1000(5) =5000$ Wh	½
	Total energy consumed in the month of September,	
	30(5000) = 150 kWh = 150 units	½
	Cost of 1 unit is Rs.6	
	Cost of 150 units = 150(6) = Rs.900	½
	(iii) Electric kettle, Iron box, Heater etc. (any two)	½ + ½