SCIENCE (086)
CLASS X
MARKING SCHEME (2022-23)

Q. No	**Questions**	Marks
	SECTION – A	
1.	(c) Only iii	1
2.	(b) MnO_2 is reduced to $MnCl_2$ & HCl is oxidized to Cl_2	1
3.	(c) Magnesium ribbon burns with brilliant white light	1
4.	(b) CO_2, Cl_2, CO_2, CO	1
5.	(d) Ferrous sulphate solution remains green with no change in the copper coin.	1
6.	(a) Only i	1
7.	(c) Addition of hydrogen in presence of catalyst changes A to C	1
8.	(b) II,III	1
9.	(b)	1
10.	(d)	1
11.	(d) C only	1
12.	(b) B and D	1
13.	(c) increases	1
14.	(b) 2 (Either North or South)	1
15.	(b) diameter d of the wire	1
16.	(d) The field consists of concentric circles centred around the wire.	1
17.	(c) A is true but R is false	1
18.	(a) Both A and R are true and R is the correct explanation of A	1
19.	(c) A is true but R is false	1
20.	(a) Both A and R are true and R is the correct explanation of A	1
	SECTION – B	
21.	Calcium hydroxide reacts with Carbon dioxide present in the atmosphere to form Calcium carbonate which results in milkiness/white ppt / Formation of Calcium carbonate (1mark) $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$ (1mark) **OR** $Fe + HCl \rightarrow FeCl_2 / FeCl_3 + H_2$ (1mark) (No deduction for balancing/ states) $Zn + HCl \rightarrow ZnCl_2 + H_2$ - 1M	2

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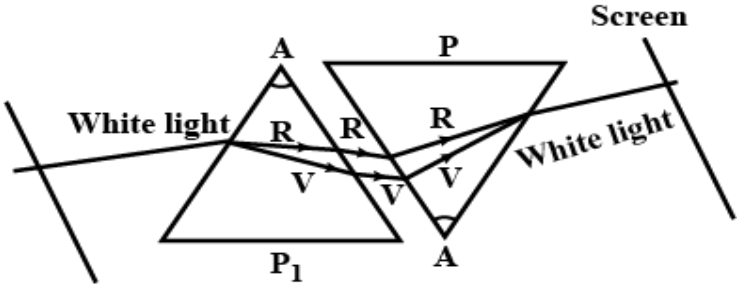
22.	<table><tr><th>Beating of heart</th><th>Reflex actions</th></tr><tr><td>Involuntary actions are the actions which are not controlled by our will.</td><td>Reflex actions are the sudden action in response to something.</td></tr><tr><td>They do not need any kind of stimulus to work.</td><td>They required stimulus for its action.</td></tr><tr><td>These actions are regulated by the brain.</td><td>These actions are regulated by the spinal cord.</td></tr><tr><td>They do not involve skeletal muscle.</td><td>They do involve skeletal muscle.</td></tr><tr><td>These actions are performed throughout one's life.</td><td>These actions are produced in response to an event of an emergency.</td></tr><tr><td>This action may be quick or slow.</td><td>Reflex actions are always quick.</td></tr></table> **Any four points** (½ x4=2 marks)	2
23.	Gallbladder stores bile which helps in emulsification of lipids (1mark). In the absence of stored bile, emulsification of fats will be negligible/ affected/ less (1mark) and thus fat digestion will be slow. Hence there are such diet restrictions.	2
24.	Glucose, amino acids, salts (any 2, 1 mark each) and a major amount of water are selectively re-absorbed as the urine flows along the tube. The amount of water reabsorbed depends on how much excess water there is in the body (0.5 marks), and on how much of dissolved waste there is to be excreted (0.5marks)	2
25.	Dispersion- The splitting of white light into seven colours on passing through a prism. (1 mark) Velocity is directly proportional to wavelength given constant frequency. So yellow will have greater wavelength than blue as the velocity of yellow light is greater than blue. (0.5 + 0.5 mark) **OR** Angle of deflections of the two prisms need to be equal and opposite. While the first prism splits the light in the seven colours due to different angles of deflection, the second prism combines the spectrum along a single ray and the colours again combine to give white light as the emergent light. (1mark)  (1mark)	2
26.	Excess generation of biodegradable wastes can be harmful as - Its decomposition is a slow process leading to production of foul smell and gases. (1mark) It can be the breeding ground for germs that create unhygienic conditions.(1 mark)	2

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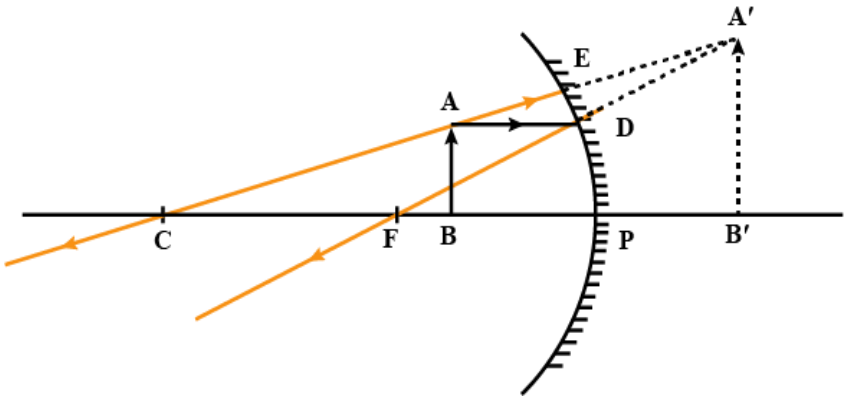
SECTION - C Q.no. 27 to 33 are short answer questions.		
27.	i) Displacement - ½ M • $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$ (1 mark) • $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$ • $Pb(s) + CuCl_2(aq) \rightarrow PbCl_2(aq) + Cu(s)$ *(Any one of the reaction or other displacement reaction.)* ii) Double displacement (½ mark) $Na_2SO_4(aq) + BaCl_2(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$ (1 mark) *(Any one of the reaction or other double displacement reaction.)*	3
28.	(a) Anode: Chlorine; Cathode: Hydrogen (b) Chlor alkali process as the products obtained are alkali, chlorine gas and hydrogen gas (c) $2NaCl(aq) + 2H_2O(l) \xrightarrow{\text{Electric current}} 2NaOH(aq) + Cl_2(g) + H_2(g)$	3
29.	No photosynthesis will occur so no glucose will be made. Also no respiration will take place as no Oxygen will be taken in. (1) No transpiration will occur so there would be no upward movement of water or minerals from the soil as there will be no transpirational pull.(1) Temperature regulation of leaf surface will be affected. (1) **OR** Lymph carries digested and absorbed fat from the intestine (1) and drains excess fluid from extracellular space back into the blood (1). Blockage of lymphatic system will lead to water retention and poor fat absorption in the body (1- any one)	3
30.	(a) The object has to be placed at a distance between 0 - 40 cm. This is because image is virtual, erect and magnified when the object is placed between F and P. (1mark) (b)  (1mark) (c) Used as shaving mirror or used by dentists to get enlarged image of teeth (any one use) (1mark)	3

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31.	(a) Given, image distance = v = -25 cm, focal length = f = 5 cm, magnification = m = ? From lens formula, $\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{u} = \frac{1}{v} - \frac{1}{f}$ $\frac{1}{u} = \frac{1}{-25} - \frac{1}{5} = \frac{-1-5}{25} = \frac{-6}{25}$ Object distance $= u = \frac{-25}{6} cm.$ We know that, $m = \frac{v}{u} = \frac{-25 \times 6}{-25} = 6.$ (2 marks) (b) This is because the least distance of distinct vision is 25 cm. (1 mark)	3
32.	(a) When iron filings are placed in a magnetic field around a bar magnet, they behave like tiny magnets. The magnetic force experienced by these tiny magnets make them rotate and align themselves along the direction of field lines. (1 mark) (b)The physical property indicated by this arrangement is the magnetic field produced by the bar magnet. (1 mark) (c) Magnetic field lines never intersect, magnetic field lines are closed curves. (1mark) **OR** (a) The deflection in the compass needle increases as Magnetic field of the current carrying conductor is directly proportional to current flowing through it. (1.5marks) (b) The deflection in the needle decreases as the magnetic field is inversely proportional to the perpendicular distance from the wire. (1.5marks)	3
33.	Damage to the ozone layer is a cause for concern because the ozone layer shields the surface of earth from harmful UV radiations from the sun which cause skin cancer in human beings. Synthetic chemicals like chlorofluorocarbons (CFCs) which are used as refrigerants and in the fire - extinguishers are the main reason for the depletion of the ozone layer. Steps taken to limit this damage - Many developing and developed countries have signed and are obeying the directions of UNEP (United Nations Environment Programme) to freeze or limit the production and usage of CFCs at 1986 levels. (1 x 3 = 3 marks)	3
	SECTION - D	
34.	(a) A – Ethanoic acid/ Or any other carboxylic acid , C- Sodium salt of ethanoic acid/ any other carboxylic acid/ sodium ethanoate (½ + ½ mark) (b) Use of A- dil solution used as vinegar in cooking/ preservative in pickles (1mark) Use of B – making perfumes, flavoring agent (1 mark) (c) $CH_3COOH + C_2H_5OH \xrightarrow{\text{Conc } H_2SO_4} CH_3COOC_2H_5 + H_2O$ (1mark) $CH_3COOC_2H_5 + NaOH \longrightarrow CH_3COONa + C_2H_5OH$ (1mark) **OR**	5

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	(a) Sulphuric acid acts as dehydrating agent (1mark) Conc H_2SO_4, 443K C_2H_5OH ——————————> $C_2H_4 + H_2O$ (1mark) (b) By reaction with sodium carbonate/ bi carbonate 1M with the samples, ethanol will not react whereas ethanoic acid gives brisk effervescence (1mark) $2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + H_2O + CO_2$ **OR** $CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + H_2O + CO_2$ (1 mark)	
35.	(a) The reason is that many multi-cellular organisms are not simply a random collection of cells. Specialised cells are organised as tissues, and tissues are organised into organs, which then have to be placed at definite positions in the body. Therefore, cell-by-cell division would be impractical. (2 marks) (b) Sexual maturation of reproductive tissues is a necessary link for reproduction because of the need for specialised cell called germ-cells to participate in sexual reproduction. The body of the individual organism has to grow to its adult size, the rate of general body growth begins to slow down, reproductive tissues begin to mature. (1½ marks) A whole new set of changes in the appearance of the body takes place like change in body proportions, new features appear. This period during adolescence is called puberty. There are also changes taking place that are different between boys and girls. In girls, breast size begins to increase, with darkening of the skin of the nipples at the tips of the breasts. Also, girls begin to menstruate at around this time. Boys begin to have new thick hair growth on the face and their voices begin to crack. (1½ marks) **OR** (a) If the niche were drastically altered, the population could be wiped out. However, if some variations were to be present in a few individuals in these populations, there would be some chance for them to survive. Variation is thus useful for the survival of species over time. (2 marks) (b) • The lining of the uterus thickens and is richly supplied with blood to nourish the growing embryo. (½ mark) • The embryo gets nutrition from the mother's blood with the help of placenta. It is embedded in the uterine wall. (½ mark) • It contains villi on the embryo's side of the tissue. On the mother's side are blood spaces, which surround the villi. (½ mark) • This provides a large surface area for glucose and oxygen to pass from the mother to the embryo. The developing embryo will also generate waste substances which can be removed by transferring them into the mother's blood through the placenta. (1 mark) • The child is born as a result of rhythmic contractions of the muscles in the uterus. (½ mark)	5

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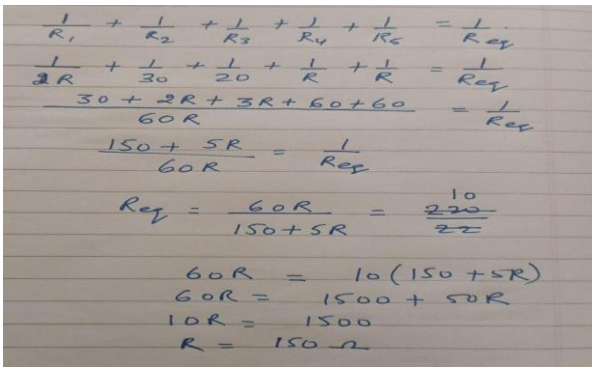
36.	(a) All spaces are connected in parallel. (1mark) (b) Let Resistance of Space 5 and 4 be R ohms respectively (2marks) Resistance of Space 1 = 2 R ohms Resistance of Space 2 = 30 ohms Resistance of Space 3 = 20 ohms Current = 22 A V= 220 V Total Resistance= V/I  $\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3}+\frac{1}{R_4}+\frac{1}{R_5}=\frac{1}{R_{eq}}$ $\frac{1}{2R}+\frac{1}{30}+\frac{1}{20}+\frac{1}{R}+\frac{1}{R}=\frac{1}{R_{eq}}$ $\frac{30+2R+3R+60+60}{60R}=\frac{1}{R_{eq}}$ $\frac{150+5R}{60R}=\frac{1}{R_{eq}}$ $R_{eq}=\frac{60R}{150+5R}=\frac{10}{\frac{220}{22}}$ $60R=10(150+5R)$ $60R=1500+50R$ $10R=1500$ $R=150\ \Omega$	5
	SECTION - E	
37.	a) Rusting occurs in both A and B so there is an increase in mass. (1 mark) As the surface area of B is more, extent of rusting is more (1 mark) b) Galvanization -(1 mark) Oiling/ greasing/ painting/ alloying/ chromium plating or any other (any two ½ mark each) – (1 mark) **OR** b) C - Iron hinges on a gate - Iron is in contact with both atmospheric oxygen and moisture/ water vapour. (2 marks)	4
38.	a. Yes, green eye colour is recessive (½ mark) as it will express only in homozygous condition (½ mark) b. BB, Bb (1 mark) c. bb*Bb (0.5mark) Genetic cross - (1 mark) 50% of the offsprings can have green eye colour (0.5)	4

	B	b
b	Bb	bb
b	Bb	bb

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OR

c. Brother is heterozygous(Bb) and wife is green(bb) - (1)
Wife bb*Bb brother

	B	b
b	Bb	bb
b	Bb	bb

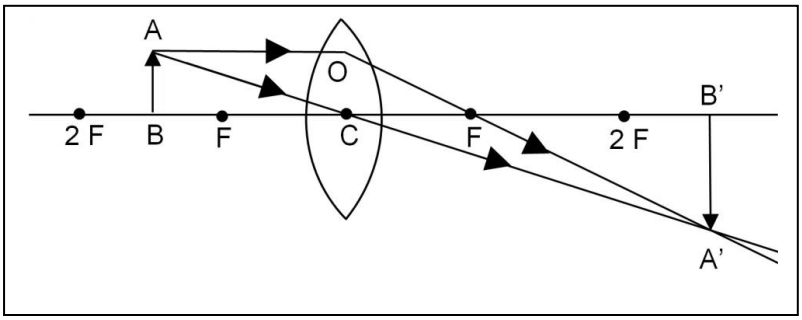
50% of the offsprings can have green eye colour as per the cross shown.(1 mark)

39. 4

(a) Convex Lens (1mark)
(b) Negative as the image is real and inverted. (1mark)
(c) 1/f= 1/v- 1/u
1/20 = 1/v- 1/-20
1/v = 1/20 - 1/21
= (21 - 20)/420
= 1/420
v= 420 cm (2 marks)

OR

(c)



(2 marks)

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