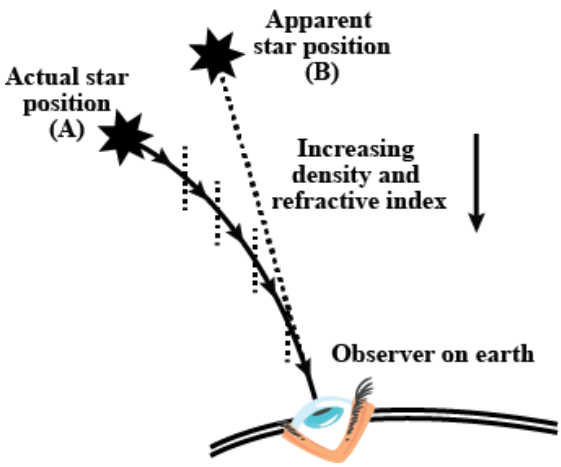
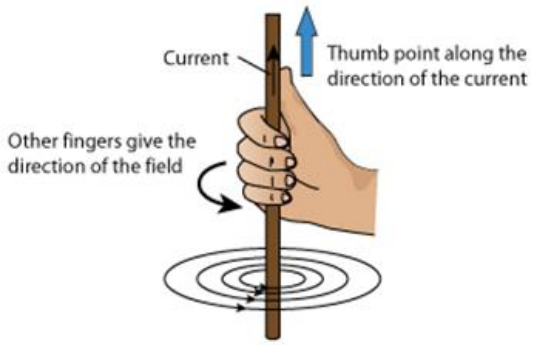
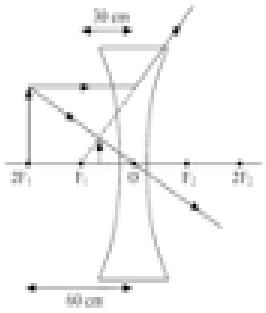
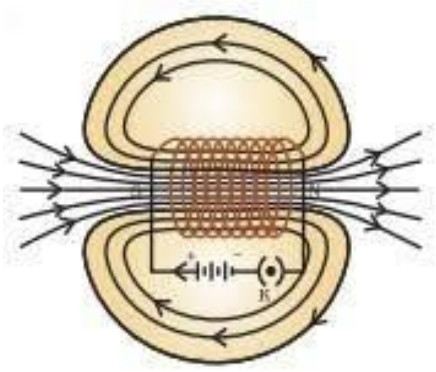
Marking Scheme (2023-24)
Class-X
Science (Subject Code – 086)

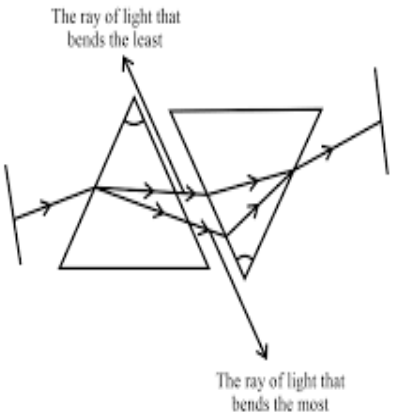
Q. No.		Marks
Section A		
1	d) Red-coloured copper is oxidized to black coloured copper(II) oxide	1
2	b) x:y = 3:4	1
3	d) Sodium carbonate.	1
4	c) Magnesium	1
5	b) Ethene	1
6	b) 	1
7	c) Burning matchstick produces a pop sound and the flame puts off	1
8	a) Digestion of proteins.	1
9	b) More growth in the region away from light due to diffusion of auxin hormone	1
10	c) peristalsis	1
11	c) 1:2:1	1
12	a) Alveoli of lungs and blood	1
13	b) 2 X 10^8m/s	1
14	d) v = +5 cm, f = + 10 cm and hi = + 7.5 cm	1
15	c) will increase in the lower trophic level	1
16	d) Biomagnification	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	b) Both A and R are true, but R is not the correct explanation of A.	1
20	a) Both A and R are true, and R is the correct explanation of A	1
Section-B		
21	1. Ammonium hydroxide (NH_4OH), Hydrochloric acid.(HCl) (0.5 +0.5) 2. $CuSO_4$, Sulphuric acid (H_2SO_4) (0.5 +0.5)	2
22	i) Non-reproductive parts are hyphae and reproductive parts are the sporangia which contain the spores. (1) ii) The spores are covered by thick walls that protect them until they come in contact with a moist surface and begin to grow. (1)	2

23	The amount of urine produced is regulated by selective reabsorption in the renal tubule of the nephron. It depends on how much excess water is there in the body and how much-dissolved waste is there to be excreted. (1) In summers more water is lost due to sweating so there is more reabsorption of water by the body to maintain osmotic balance. (1) **OR** This prevents oxygenated and deoxygenated blood from mixing. (0.5) This allows a highly efficient supply of oxygenated blood to all parts of the body (1) This is useful in animals with high energy needs such as birds and mammals. (0.5)	2
24	a) Because red colour light has the highest wavelength and is least scattered. (1) b) Because the optical density of atmospheric layers is more so the light travelling from space to the atmosphere bends towards the normal and thus its position appears slightly raised. (1) **OR**  Full marks for a labelled diagram	2
25	i) The current is in a clockwise direction. (1) ii) The right-hand thumb rule states that if you imagine that you are holding a current-carrying straight conductor in your right hand such that the thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field. (1) **OR**	2

	 Right Hand Grip Rule **OR** a) Fleming's left-hand rule: Stretch the forefinger, middle finger and the thumb of your left hand such that they are mutually perpendicular to each other. If the forefinger indicates the direction of magnetic field and the middle finger indicates the direction of current, then the thumb will indicate the direction of motion of the conductor or the force acting on the conductor. (1) b) The displacement of the rod is largest when the direction of current is at right angles to the direction of the magnetic field. (1)	
26	Air pollutants like CFCs caused the depletion of this protective shield. (1) Ozone layer shields the surface of earth from harmful UV rays from the sun which are known to cause skin cancer in human beings. (1)	2
	Section- C	
27	a) Test tube B (1) b) Copper is lower to Iron in the reactivity series so displacement reaction will be maximum (1) c) $Fe\ (s) + CuSO_4\ (aq,) \longrightarrow FeSO_4(aq.) + Cu\ (s)$ (1)	3
28	(A) - Aluminium (0.5) (B) - Al_2O_3 (0.5) $Al_2O_3 + 6HCl \longrightarrow 2AlCl_3 + 3H_2O$ (1) $Al_2O_3 + 2NaOH \longrightarrow 2NaAlO_2 + H_2O$ (1) **OR** a) Carbon cannot reduce the oxides of sodium, magnesium, calcium, aluminium, etc., to the respective metals. This is because these metals have more affinity for oxygen than carbon. (Metals, Na, Mg, Ca and Al hve more affinity towards oxygen than C) (1) b) The reactions are – At cathode $Na^+ + e^- \rightarrow Na$ (0.5) – At anode $2Cl^- \rightarrow Cl_2 + 2e^-$ (0.5) c) $3MnO_2\ (s) + 4Al(s) \rightarrow 3Mn(l) + 2Al_2O_3\ (s) + Heat$ (1)	3

29	a) To prevent unwanted pregnancies (1) b) To control population and birth rate (1) c) To prevent the transfer of sexually transmitted diseases (1)	3
30	a) Fore brain b) medulla in hind – brain c) Cerebellum	3
31	Given, u= - 15 cm, f= 20 cm, v=? Using lens formula, 1/v- 1/u= 1/f (0.5) 1/v= - 1/60 V= -60 cm (0.5) m= hi/ho= v/u (0.5) hi= 16 cm (0.5) Image formed is virtual, erect and magnified. (Any two) (1) **OR** a) We need to calculate the image distance. Given, u = -60 cm, f = -30 cm, v =? Using lens formula, 1/v - 1/u= 1/f (0.5) 1/v = 1/f + 1/u 1/v = -1/30 -1/60 = -1/20 v = -20 cm (1) The diminished image is formed on the same side as the object and at a distance of 20 cm from the lens. (0.5) b)  Diagram (1)	3
32	a) Given, I = 10 A, t = 2 min = 2 × 60 s = 120 s i) Q = I × t (0.5) ∴ Q = 1200 C (0.5) ii) Q = ne (0.5) ∴ 1200 = n × 1.6 × 10^{-19} C or n = 1200/1.6×10^{-19} = 7.5 × 10^{21} electrons (0.5) b) As graph is a straight line, so it is clear from the graph that V ∝ I. Hence the resistance of the conductor is constant. (1)	3

33	 a) Diagram (1), direction of current (0.5), direction of field lines (0.5) b) 1. Do not connect too many devices in the same socket. 2. Do not connect faulty appliances in the socket. 3. Multiple high power consumption devices should not be connected at the same time. (any two) (0.5+0.5)	3
	Section- D	
34	a) P = Ethanol (1) b) Industrial solvent/ ingredient of cough syrup/ homeopathic medicine / lab reagent - any one or any other (1) C_2H_5OH —--acidified $K_2Cr_2O_7$—---> CH_3COOH (1) (P) (Q) c) $2Na + 2CH_3COOH$ —--------> $2CH_3COONa + H_2$ (1) (Q) (R) d) Dehydration of ethanol occurs / C_2H_5OH —--conc.H_2SO_4—->$C_2H_4 + H_2O$ (1) (P) **OR** Ethanoic acid Y= H_3COOH (0.5+0.5) a) The gas evolved 'W' turns Lime water milky (1) b) C_2H_5OH—---- Acid.$K_2Cr_2O_7$—---> CH_3COOH (1) (X) (Y) $C_2H_5OH + CH_3COOH$ —-----> $CH_3COOC_2H_5 + H_2O$ (1) (X) (Y) (Z) c) Esterification Rn (0.5) d) Anyone use - perfumes/cosmetics; H_2SO_4 C_2H_5OH----------→ $C_2H_4 + H_2O$ (0.5)	5
35	a) The flow of energy is unidirectional in a food chain. The energy that is captured by the autotrophs does not revert back to the solar input and the energy which passes to the herbivores does not come back to autotrophs. As it moves progressively through the various trophic levels it is no longer available to the previous trophic levels. (2) b) i. F1 generation: All Round yellow (RrYy) (0.5) F2 generation: round yellow:9; round green:3; wrinkled yellow: 3 wrinkled green :1 (1)	5

	ii. If progeny plants inherited a single whole gene set from each parent, then the ratio 9:3:3:1 will not be obtained. (0.5) This is because the two characteristics "R" and "y" would then be linked to each other and cannot be independently inherited. (1) **OR** a) When sugar levels in the blood rise, they are detected by the cells of the pancreas which respond by producing more insulin. As the blood sugar level falls, insulin secretion is reduced. The timing and amount of hormones to be secreted are regulated by the feedback mechanism. (2) Adrenaline; Adrenal gland (0.5 + 0.5) · It acts on heart. Heart beats faster, resulting in more supply of oxygen to skeletal muscles. · Breathing rate also increases because of contraction of diaphragm and the rib muscles. (1 + 1)	
36	a) Hypermetropia or long sightedness. (1) b) Two possible causes: Curvature of eye lens decreases. (1) Shortening of eye ball. (1) c) Given, u= -25 cm, v= -75 cm, f= ? 1/f= 1/v- 1/u (0.5) f= 37.5 cm (0.5) P= 100/f (0.5) = +2.67 D (0.5) **OR** a) The focal length of the eye lens cannot be decreased below a certain minimum limit. As a result, the sharp image of the object is not formed on the retina but behind the retina of the lens. (1)  Diagram (1), labelling & arrows (1) b) The necessary conditions for the formation of a rainbow are: i) The presence of water droplets in the atmosphere, and (1) ii) The sun must be at the back of the observer, i.e., the observer must stand with his back towards the sun. (1)	5

Section - E		
37	Ant bite/ to prevent tooth decay/ antacid to reduce acidity a) X=Cl_2 gas, Y= H_2 gas (0.5 +0.5) b) $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$ (1) (A) c) (i) does not change to red, (ii) Yellow colour (1+1) **OR** $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$ (1) The Hydrogen Chloride gas produced turns only wet blue Litmus red as HCl get dissociated in water to give out H^+ ion. (1)	4
38	a) 7. Right ventricle, 2. Pulmonary arteries (0.5+0.5) b) Valves - They ensure that blood does not flow backwards when atria or ventricles contract. (1) c) Left and right Ventricles (6 and 7) have thicker walls as compared to left and right atria (8 and 9). They have to pump blood out of the heart. They pump blood at a higher pressure to ensure it reaches all parts of the body. (1+1) **OR** i) 8. Left atrium, 3. pulmonary veins ii) The separation of the right and left side of the heart is useful to prevent mixing of oxygenated blood and deoxygenated blood. (1+1)	4
39	a) R = V/I (0.5) = 12/6 = 2 Ω (0.5) b) R_A = 12/2 = 6Ω (0.5) R_B = 12/4 =3 Ω (0.5) c) For the given circuit, $R \propto l$ and $R \propto 1/I$ The resistance of 'A' is twice that of 'B' and so the current in both will not be the same but in the ratio of 1:2, so the current in 'A' will be 2A and that in 'B' will be 4A. (2) $I_A = V/R_A = 12 / 6 = 2$ A $I_B = V/R_B = 12/3 = 4$ A **OR** c) resistivity is defined as the electrical resistance of a conductor of unit cross-sectional area and unit length. (1) it is the characteristic property of the material and depends on the nature of the material. (1)	4