MARKING SCHEME

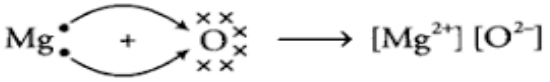
SCIENCE (Subject Code-086)

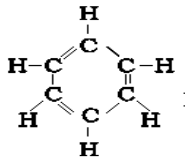
(PAPER CODE: 31/2/1) (10-02-86K)

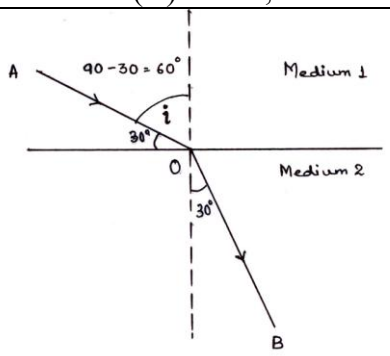
Q.No.	EXPECTED OUTCOMES/VALUE POINTS	Marks	Total Marks
	SECTION - A		
	Biology		
1.	(D) / 1 : 2 : 1	**1**	**1**
2.	(C) / Chemotropism	**1**	**1**
3.	(C) / Asexual reproduction by breaking up of *Spirogyra* filaments into smaller parts.	**1**	**1**
4.	(A) / Starch	**1**	**1**
5.	(B) / (ii) and (iii)	**1**	**1**
6.	(B) / T5	**1**	**1**
7.	(C) / Decrease in energy at higher levels.	**1**	**1**
8.	(A) / Both Assertion (A) and Reason (R) are true and (R) is the correct explanation of (A). **OR** (C)/ Assertion (A) is true but Reason (R) is false	**1**	**1**
9.	(B) /Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).	**1**	**1**
10.	(a) The timing and amount of hormone released are regulated by feedback mechanism. For example, if the 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. (Any other suitable example) **OR** (b) • Electrical impulse reaches only those cells that are connected by nervous tissue, not each and every cell in the animal body. • Once an electrical impulse is generated in the cell and transmitted, the cell will take some time to reset its mechanism before it can generate and transmit a new impulse. / Transmission of electrical impulses is not a continuous process.	**2** **1** **1**	**2**
11.	Variation provides chance for species to survive under unfavourable / changing environmental conditions. e.g. if there were a population of bacteria living in temperate waters and if water temperature increased by global warming, most of these bacteria would die but the few variants resistant to heat would survive and grow further. (or any other suitable example)	**2**	**2**

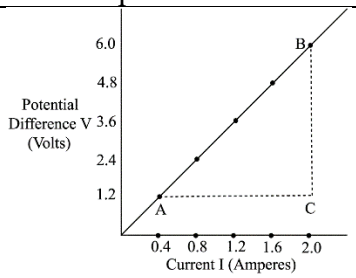
12.	(i) Composting (ii) recycle/reuse (iii) recycle/reuse (iv) Incineration (or any other relevant answer)	½ ½ ½ ½	**2**
13.	A: Cytoplasm / A: Cytoplasm B: Ethanol / B: Carbon dioxide C: Carbon dioxide / C: Ethanol D: Lactic acid / D: Lactic acid E: Carbon dioxide / E: Water F: Water / F: Carbon dioxide	½ ½ ½ ½ ½ ½	**3**
14.	(a) • In a few reptiles, the temperature at which fertilised eggs are kept determine whether the animal developing from the eggs will be male or female. • In snails, individuals can change sex. (or any other suitable example) (b) Male sex chromosome / Female sex chromosome Male has a mismatched pair i.e, 'XY' chromosomes. / Female has a perfect pair i.e. 'XX' chromosomes. Y chromosome is smaller than X chromosome. / Both X chromosomes are of same size. (Any one difference, Any other difference)	**1** **1** **1**	**3**
15.	(a) Actions which are controlled by forebrain / Actions which are under our control and are performed according to our will. (b) Cerebellum. (c) (i) Regulates involuntary functions like heart rate/ blood pressure/ breathing / sneezing/ vomiting. **OR** (c) (ii) Animal muscles are made up of special proteins, that change both shape and arrangement in response to nervous electrical impulses, new arrangements of these proteins give the muscle cells a shorter form so, muscle cells move which help animals to move.	**1** **1** **2** **2**	**4**
16.	(a) (i) • Organ - Testes • Conditions - Requires a lower temperature than the normal body temperature/Secretion of testosterone.	**1** **1**	

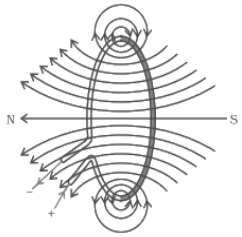
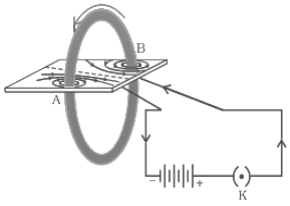
	(ii) The sperms formed in the testes are carried by Vas deferens and delivered to urethra (Common passage for both sperms and urine). / Testes →Vas deferens → Urethra (iii) Long tail of sperms. **OR** (b) (i) • Mechanical barrier / Female condom (Diaphragm)/ similar covering worn in vagina • Oral contraceptives/ Oral pills • Copper - T / loops. (any two methods, any other method) (ii) Surgical methods • Vas deferens in the male is blocked / Vasectomy • Fallopian tube in the female is blocked /Tubectomy (iii) • Bacteria - Gonorrhoea / Syphilis (any other example) • Virus - Warts / AIDS (any other example)	**2** **1** **2** **2** ½ ½	**5**
	SECTION – B **Chemistry**		
17.	(D) / (ii)and (iii)	**1**	**1**
18.	(C) / X-Hydrochloric acid, Y-Carbon dioxide	**1**	**1**
19.	(C) / The green colour of the salt fades and a gas with the smell of burning sulphur is evolved.	**1**	**1**
20.	(B) / Mg reacts with water to produce H_2 gas which helps in floating.	**1**	**1**
21.	(A) / Less than 7	**1**	**1**
22.	(C) / Sodium hydrogen carbonate +Tartaric acid	**1**	**1**
23.	(B) / The jewellery comes in contact with air, moisture and acids and corrodes.	**1**	**1**
24.	(A) / Both A and R are true and R is the correct explanation of A.	**1**	**1**
25.	(i) • Test tube B • Iron is more reactive than copper, so iron can displace copper from copper sulphate solution. (ii) $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$	½ ½ **1**	**2**

26.	(a) (i) • Lithium (Li) / Sodium (Na) / Potassium (K) (anyone) • Graphite (ii) $Mg_{[2,8,2]} \longrightarrow Mg^{2+}_{[2,8]} + 2e^-$ $O_{[2,6]} + 2e^- \longrightarrow O^{2-}_{[2,8]}$  **OR** (b)(i) It is easier to obtain metal from its metal oxide / It is easier to reduce metal oxide to metal. (ii) Aluminium oxide can react with both acids as well as bases to form salt and water. / $Al_2O_3 + 6HCl \rightarrow 2AlCl_3 + 3H_2O$ $Al_2O_3 + 2NaOH \rightarrow 2NaAlO_2 + H_2O$ (iii) As they are highly reactive metals so exist in combined state.	½ ½ ½ ½ 1 1 1 1	**3**
27.	• Colour of copper powder changes from brown to black. • On passing H_2 gas, the colour turns brown. • $2Cu + O_2 \xrightarrow{heat} \underset{\text{copper oxide (Black)}}{2CuO}$ $CuO + H_2 \xrightarrow{heat} Cu + H_2O$ (copper (Brown)) (Award ½ mark for equation and ½ mark for name and colour in each case.)	½ ½ ½+ ½ ½+ ½	**3**
28.	(a) X - Chlorine gas Y -Hydrogen gas (b) $2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$ (Deduct ½ marks for no/incorrect balancing) (c) (i) (I) The red litmus solution will turn blue. (II) Sodium hydrogen carbonate and Ammonium chloride will be formed / $NaHCO_3$ and NH_4Cl will be formed. / $NaCl + H_2O + CO_2 + NH_3 \rightarrow \underset{\text{(Ammonium chloride)}}{NH_4Cl} + \underset{\text{(Sodium hydrogencarbonate)}}{NaHCO_3}$	½ ½ 1 1 1	

	OR (c) (ii) • Bleaching Powder / $CaOCl_2$ / $Ca(ClO)_2$ • $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$ / $2Ca(OH)_2+2Cl_2 \rightarrow Ca(ClO)_2+CaCl_2+H_2O$ (Deduct ½ mark for no/incorrect balancing)	**1** **1**	**4**
29.	(a) (i) P- Ethanol /C_2H_5OH / CH_3CH_2OH (ii) (I) $CH_3-CH_2OH \xrightarrow[H_2SO_4]{\text{Hot Conc.}} CH_2=CH_2 + H_2O$ (II) Dehydrating agent / Catalyst (iii) • Sweet smelling compound/ester is formed. • $CH_3-COOH + CH_3-CH_2OH \rightleftharpoons[\text{Acid}] CH_3-\underset{\underset{O}{\|}}{C}-O-CH_2-CH_3 + H_2O$ **OR** (b) (i)  (any other resonating structure) (ii) Carbon cannot form C^{4+} cation because removal of four electrons is energetically not possible. Carbon cannot form C^{4-} anion because nucleus with six protons cannot hold ten electrons. (iii) Covalent bond (iv) $CH_3-CH_2OH \xrightarrow[\text{Or acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3COOH$ / Ethanol is converted to Ethanoic Acid by adding Alkaline $KMnO_4$/Acidified $K_2Cr_2O_7$ as oxidising agent. (v) $CH_3COOC_2H_5 \xrightarrow{NaOH} C_2H_5OH+CH_3COONa$	**1** **1** **1** **1** **1** **1** **1** **1** **1** **1**	**5**
	SECTION – C **PHYSICS**		

30.	(A) / Concave mirror, Nature of image-real	**1**	**1**
31.	(B) / Red, Yellow, Green, Blue, Violet	**1**	**1**
32.	(C) / Assertion (A) is true, but reason (R) is false.	**1**	**1**
33.	 $\frac{\text{Sin i}}{\text{Sin r}} = n$ $\angle i = 90° - 30° = 60°$ $\frac{\text{Sin } 60°}{\text{Sin } 30°} = n$ $n = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}$ $n = \sqrt{3}$	½ 1 ½	**2**
34.	(a) • If the distance of the object from the eye is increased, ciliary muscles relax, lens becomes thin and so the focal length increases. • If the distance between the object from the eye is decreased, the ciliary muscles contract, lens becomes thick and the focal length decreases. **OR** (b) In myopic eye image is formed in front of the retina. A concave lens / diverging lens of suitable power will bring the image back on to the retina.	**1** **1** **2**	**2**
35.	(a) Magnification, $m = \frac{\text{Image distance}}{\text{Object distance}}$ / $m = \frac{v}{u}$ (b) $h_o = +4$ cm $f = +20$ cm $u = -10$ cm $h_i = ?$ $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{20} + \frac{1}{-10}$ $\frac{1}{v} = \frac{-1}{20}$ $v = -20$ cm	**1** ½ ½	

	$m = \frac{v}{u}$ $m = \frac{-20}{-10}$ $m = 2$ $m = \frac{\text{height of image}}{\text{height of object}}$ height of image = m × height of object height of image = 2 × 4 cm = 8 cm	**1**	**3**
36.	• The phenomenon of spreading light in different directions on interaction with particles of the medium. • Light bounces back in a fixed direction after reflection while in scattering of light, it spreads in different directions. / Reflection of light is independent of the size of reflecting particles whereas the colour of the scattered light depends upon the size of scattering particles.	**1** **2**	**3**
37.	 Resistance = Slope of V – I graph $R = \frac{BC}{AC}$ $R = \frac{6.0 - 1.2}{2.0 - 0.4}$ $R = 3\ \Omega$	**2** **½** **½**	**3**
38.	(a) A part of current is consumed into useful work and rest is expended in heat to raise the temperature of gadget. (any other suitable explanation) (b) W=V x Q= VIt = IR x It $H = I^2Rt$ / $\frac{V^2}{R}t$ (c) (i) Electric heater, Oven, Electric iron (Any two, Any other) **OR** (c) (ii) When 1 kilowatt of power is used for 1 hour then energy consumed is 1 kWh 1 kWh = 3.6×10^6J	**1** **1** **1+1** **1** **1**	**4**
39.	(a) (i) Stretch the thumb, fore finger and middle finger of your left hand such that they are mutually perpendicular. If the first finger (forefinger) points in the direction of the magnetic field and the middle finger (second finger) in the direction of the current, then the thumb will point in the direction of motion or the force acting on the conductor. (ii)	**1**	

	• A fuse is a safety device in electric circuit designed to protect against overloading. • Because it prevents damage to the circuit and appliance.	½ ½	
	(iii) Three pin plug connects the metallic body of an appliance with the earth wire which provides a low resistance path for electric current to flow to the ground and hence prevents us from electric shock. The bulb with a non metallic body does not require earthing and so is connected to a two pin plug.	**1**	
	(iv) • Into the page. • Fleming's Left-hand rule	**1** **1**	
	OR		
	(b) (i)  /  Any one diagram Direction of magnetic field lines and current	**1** **1**	
	(ii) 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**	
	(iii) (I) If a fuse of higher rating is used it will not be able to prevent the damage due to overloading. / If a fuse of lower rating is used, it will melt and the appliance will not work.	**1**	
	(II) Soft iron core can be easily magnetised when current flows through the solenoid and gets demagnetised quickly when current stops flowing.	**1**	**5**