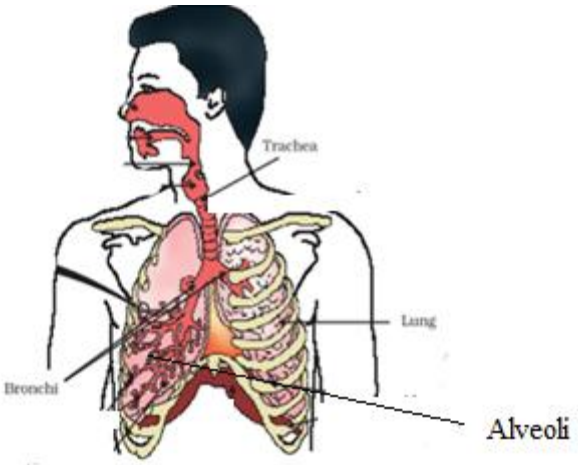
MARKING SCHEME

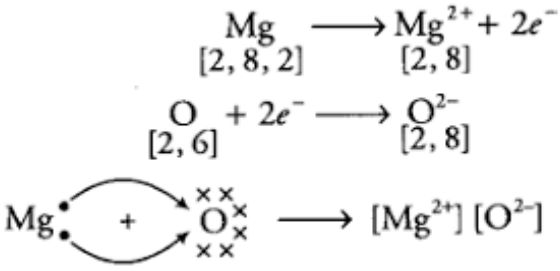
SCIENCE (Subject Code-086)

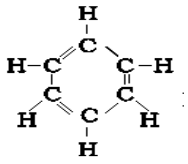
(PAPER CODE: 31/2/3) (10-02-86K)

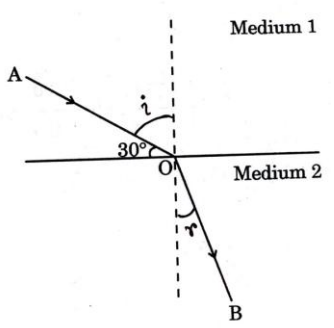
Q.No.	EXPECTED OUTCOMES/VALUE POINTS	Marks	Total Marks
	Section – A **Biology**		
1.	(A) / Starch	**1**	**1**
2.	(C) / Asexual reproduction by breaking up of *Spirogyra* filaments into smaller part.	**1**	**1**
3.	(C) / Chemotropism	**1**	**1**
4.	(D) / 1:2:1	**1**	**1**
5.	(D) / $6CO_2+12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6+6O_2+6H_2O$	**1**	**1**
6.	(C) / Decrease in energy at higher levels.	**1**	**1**
7.	(B) / T5	**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.	• No • Different variations give different advantages to organisms and only those which are beneficial to the organisms for survival are passed on to their progeny. Example- if there were a population of bacteria living in temperate waters and if water temperature increased by	**½** **1½**	

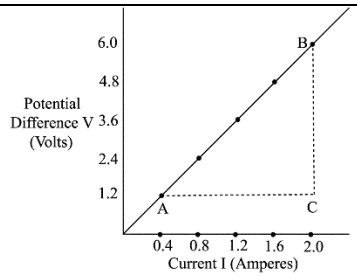
	global warming, most of these bacteria would die but the few variants resistant to heat would survive and grow further.		**2**
12.	(a) Sewage should not contain solid waste, so sieve should be installed at the opening of drain. (or any other valid point) (b) Chemical treatment of industrial waste should be done before disposing it off. (or any other valid point)	**1** **1**	**2**
13.	(a)  (Award ½ mark for each labelling) (b) (i) Alveoli - Exchange of gases (ii) Respiratory pigment - Helps in the transportation of oxygen	**2** **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. (Any other 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.	**1** **1**	

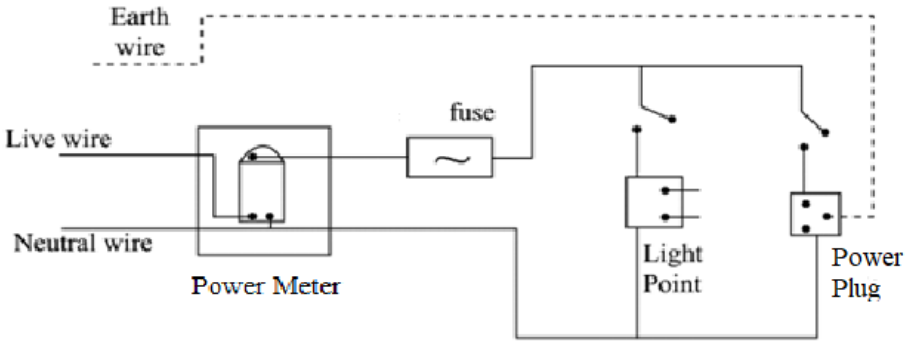
	(c)(i) Regulates involuntary functions like heart rate/ blood pressure/ Breathing / sneezing/ vomiting. **OR** (ii) Animal muscles are made up of special proteins, that change both shape and arrangement in response to nervous electrical impulses, new arrangements of these proteins give the muscle cells a shorter form so, muscle cells move which help animals to move.	**2** **2**	**4**
16.	(a) (i) • Organ - Testes • Conditions - Requires a lower temperature than the normal body temperature/Secretion of testosterone. (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)	**1** **1** **2** **1** **2** **2** **½** **½**	**5**
	SECTION – B **Chemistry**		
17.	(C) / Oxalic acid	**1**	**1**
18.	(B) / Washing soda	**1**	**1**
19.	(C) / (i) and (iii)	**1**	**1**
20.	(C) / X-Hydrochloric acid, Y-Carbon dioxide	**1**	**1**

21.	(C) / The green colour of the salt fades and a gas with the smell of burning sulphur is evolved.	**1**	**1**
22.	(B) / The jewellery comes in contact with air, moisture and acids and corrodes.	**1**	**1**
23.	(B) / Mg reacts with water to produce H_2 gas which helps in floating.	**1**	**1**
24.	(A) / Both A and R are true and R is the correct explanation of A.	**1**	**1**
25.	(a) $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$ (b) $Ca(s) + 2H_2O(l) \rightarrow Ca(OH)_2(aq) + H_2(g)$ (Deduct ½ mark for no/incorrect balancing in each case)	**1** **1**	**2**
26.	(a) (i) • Lithium (Li) / Sodium (Na) / Potassium (K) (anyone) • Graphite (ii)  **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	**3**
27.	(a) The process in which a metal is attacked by substances around it such as moisture, acids etc. (b) Oxidation of fats and oils present in food resulting in change of its smell and taste. (c) The reaction in which there is an exchange of ions takes place between the reactants.	**1** **1** **1**	**3**
28.	(a) X - Chlorine gas Y - Hydrogen gas (b)	½ ½	

	$2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$ (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. / $NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$ (Ammonium chloride) (Sodium hydrogencarbonate) **OR** (c) (ii) • A-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 1 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. • $CH_3 - COOH + CH_3 - CH_2OH \overset{\text{Acid}}{\rightleftharpoons} CH_3 - \underset{\underset{O}{\|}}{C} - O - CH_2 - CH_3 + H_2O$ **OR** (b) (i)  (or 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.	1 1 1 1 1 1 1	

	(iii) Covalent bond	**1**	
	(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.	**1**	
	(v) $CH_3COOC_2H_5 \xrightarrow{NaOH} C_2H_5OH + CH_3COONa$	**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.	 $\frac{\text{Sin i}}{\text{Sin r}} = n$ $\angle i = 90° - 30° = 60°$ $\text{Sin r} = \frac{\text{Sin i}}{n}$ $\text{Sin r} = \frac{\text{Sin } 60}{\sqrt{3}}$ $\text{Sin r} = \frac{\sqrt{3}}{2\sqrt{3}}$ $\text{Sin r} = \frac{1}{2} \Rightarrow \text{Sin r} = \text{Sin } 30$ $r = 30°$	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) • Convex lens • When object is placed between focus and optical centre (b) $f = +20$ cm $u = -30$ cm $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{20} + \frac{1}{-30}$ $\frac{1}{v} = \frac{1}{60}$ $v = 60$ cm The image is formed at a distance of 60 cm on the other side of the optical centre. • Nature of image – Real, inverted	½ ½ ½ ½ **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.	 	**2**	

	Resistance = Slope of V – I graph $R = \frac{BC}{AC}$ $R = \frac{6.0 - 1.2}{2.0 - 0.4}$ $R = 3\ \Omega$	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) • There will be repulsion • Right end of X magnet and left end of Y magnet behaves as north pole. Like poles repel each other. (ii) (I) Displacement of conductor increases. (II) Displacement of conductor increases. (III) Direction of deflection reverses / Conductor gets displaced towards right. **OR** (b) (i)  Diagram Labelling of each part asked in the question	**1** **1** **1** **1** **1** **1** **½ x 4**	

	(ii) An earth wire provides a low resistance conducting path for the current and thus, protect us from electric shock due to leakage of electric current to metallic body of electric appliances.	**2**	**5**