MARKING SCHEME
SCIENCE (Subject Code-086)
(PAPER CODE: 31/1/2) (10-01-86K)

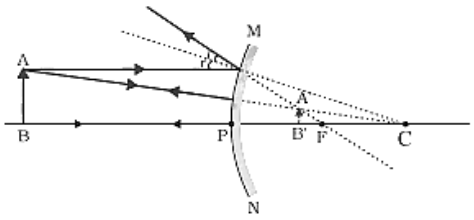
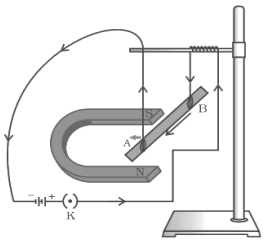
<table>
<tr><th>Q.No.</th><th>EXPECTED OUTCOMES/VALUE POINTS</th><th>Marks</th><th>Total Marks</th></tr>
<tr><td colspan="4">SECTION – A
(Biology)</td></tr>
<tr><td>1.</td><td>(C)/ (i), (ii) and (iv)</td><td>1</td><td>1</td></tr>
<tr><td>2.</td><td>(B) / Stomata</td><td>1</td><td>1</td></tr>
<tr><td>3.</td><td>(C) /Vegetative propagation</td><td>1</td><td>1</td></tr>
<tr><td>4.</td><td>(C) / Polythene bag, rubber band, ball pen</td><td>1</td><td>1</td></tr>
<tr><td>5.</td><td>(B) / Cerebellum</td><td>1</td><td>1</td></tr>
<tr><td>6.</td><td>(D) / they reproduce asexually</td><td>1</td><td>1</td></tr>
<tr><td>7.</td><td>(B) / Trypsin digests proteins and lipase digests emulsified fats</td><td>1</td><td>1</td></tr>
<tr><td>8.</td><td>(C) / Assertion (A) is true, but Reason (R) is false.</td><td>1</td><td>1</td></tr>
<tr><td>9.</td><td>(B) / Both, A and R are true, but Reason (R) is not the correct explanation of Assertion (A).</td><td>1</td><td>1</td></tr>
<tr><td>10.</td><td>(a)
<table>
<tr><th>Chewing of food</th><th>Salivation on sight of food</th></tr>
<tr><td>i) It is a voluntary action.
ii) It is controlled by forebrain.</td><td>i) It is a reflex/involuntary action.
ii)It is controlled by medulla in the hind brain.</td></tr>
</table>
(any other suitable difference)
OR
(b)
<table>
<tr><th>Pollination</th><th>Fertilization</th></tr>
<tr><td>i) It is the transfer of pollen grains from anther to the suitable stigma.
ii) It occurs in plants.</td><td>i) It is the fusion of male gamete with the female gamete.
ii)It occurs in both plants and animals.</td></tr>
</table>
(any other suitable difference)</td><td>1
1
1
1</td><td>2</td></tr>
<tr><td>11.</td><td>Squirrel shows fight or flight response -Release of adrenaline, heart beats faster, more supply of oxygen to muscles (limb muscles), reduced blood supply to digestive system and skin, contraction of rib muscles and diaphragm, increased breathing rate.</td><td>2</td><td>2</td></tr>
<tr><td>12.</td><td>(a)
<table>
<tr><th>Sensory Nerve</th><th>Motor Nerve</th></tr>
<tr><td>(i) Carries impulse from receptors to CNS/ Brain and Spinal cord.</td><td>(i) Carries impulse from CNS/Brain and Spinal cord to the motor area/ effector organ.</td></tr>
</table>
(any other suitable difference)</td><td>1</td><td></td></tr>
</table>

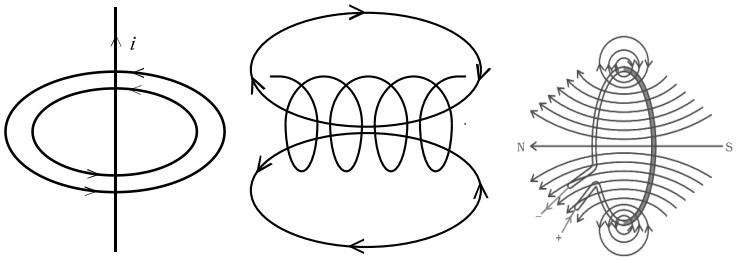
	(b) Consumers: (i) Organisms that feed on producers and other consumers. (ii) Transfers energy through the food chain. Decomposers: (i) Organisms that breakdown dead organic matter into simpler inorganic substances. (ii) Recycle nutrients back into the environment. (any one, any other suitable difference)	1	2
13.	(a) No, it is purely a matter of chance, as male produces 50% X-type and 50% Y-type of sperms and any sperm can fertilize the ova. (b) • 50% chance. • Parents : XX (Mother) x XY (Father) Gametes : (X), (X) (X), (Y) F_1 XX XY XX XY girl boy girl boy 2 girls : 2 boys 50% chance of daughter.	½ + ½ ½ 1½	3
14.	(a) (i) Grass (ii) Deer, Rabbit (iii) Snake, Lion (iv) Lion (b) Primary consumers feed on green plants which have large amount of energy. Only 10% of its energy is available/passed for the next secondary consumer /trophic level. (c) The base is broad as the number/energy/mass of producers is usually, the highest in comparison to other trophic levels of pyramid.	1 1 1	3
15.	(a) In F_1 progeny, pea plants have 'Tt' where 'T' is dominant over 't' so all the plants of F_1 progeny were tall. / Tall height is dominant trait over short height. (b) Self-pollination (c) (i) Dominant trait: i) Expresses itself over recessive trait. ii) Expresses in both conditions- TT and Tt. Recessive trait: i) Unable to express itself in presence of a dominant trait. ii) Expresses itself only when it is 'tt' or in pure condition. (any one, any other suitable difference)	1 1 2	

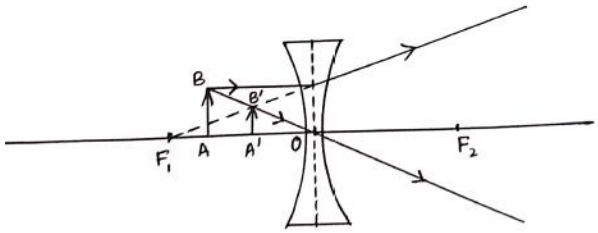
	OR (c) (ii) Mendel's observations: • All plants of F_1 progeny were tall. • No medium/ no short height plants observed in F_1 progeny. • F_1 progeny resembled one parent only. (any two observations)	**1+1**	**4**
16.	(a) (i) When spores land on a substance and get adequate moisture and temperature, it will develop into new *Rhizopus*. (ii) New plants grow from the buds located in the notches of the leaf. (iii) The pollen tube will not be formed. / No fertilisation will take place. (iv) Fertilization /Pregnancy will be prevented. (v) Each fragment or piece grows into a new individual organism. **OR** (b) (i) Most of these bacteria would die, but the few variants resistant to heat would survive and grow further. (ii) Fertilization occurs to form a zygote. (iii) Cross pollination may occur leading to fruit formation. / No fertilization. / No fruit formation. (iv) If the egg is not fertilised, the thick and spongy lining of the uterus breaks and comes out through vagina as blood and mucus, known as menstruation. / Menstruation will take place. (v) The seed will develop into a seedling. / Germination will take place.	**1** **1** **1** **1** **1** **1** **1** **1** **1**	**5**
	SECTION – B **(Chemistry)**		
17.	(B) / Calcium	**1**	**1**
18.	(A) / tomato, curd, ant-sting	**1**	**1**
19.	(A) / Pb	**1**	**1**
20.	(B) / -COOH	**1**	**1**
21.	(D) / NO_2 and O_2	**1**	**1**
22.	(B) / Vanilla essence	**1**	**1**
23.	(C) / Both, (i) and (ii) are double displacement reactions and precipitation reactions.	**1**	**1**
24.	(A) / Both, Assertion(A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).	**1**	**1**
25.	• Tooth decay starts when pH of mouth is lower than 5.5. • It can be prevented by cleaning the mouth after eating. / By using toothpastes as they are basic in nature. (any other preventive method)	**1** **1**	**2**

26.	(a) • When electricity is passed through brine, it decomposes to form sodium hydroxide (alkali) and chlorine, hence this process is called chlor-alkali process. $2NaCl(aq) + 2H_2O(l) \xrightarrow{\text{Electricity}} 2NaOH(aq) + H_2(g) + Cl_2(g)$ • At anode: Cl_2 • At cathode: H_2 **OR** (b) (i) $NaCl + H_2O + NH_3 + CO_2 \rightarrow NaHCO_3 + NH_4Cl$ (ii) $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$ / $2Ca(OH)_2 + 2Cl_2 \rightarrow Ca(ClO)_2 + CaCl_2 + 2H_2O$ (iii) $CaSO_4.2H_2O \xrightarrow{373K} CaSO_4.\frac{1}{2}H_2O + 1\frac{1}{2}H_2O$ (deduct ½ mark for no / incorrect balancing)	**1** **1** **½** **½** **1** **1** **1**	**3**
27.	(a) $CaO(s) + H_2O(l) \rightarrow Ca(OH)_2 + Heat$ (b) $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$ (c) $2FeSO_4(s) \xrightarrow{\text{Heat}} Fe_2O_3(s) + SO_2(g) + SO_3(g)$ (deduct ½ mark for no / incorrect balancing)	**1** **1** **1**	**3**
28.	(a) Because it is easier to obtain metal from its oxide. / Because it is easier to reduce metal oxide to metal (b) $Fe_2O_3(s) + 2Al(s) \rightarrow 2Fe(l) + Al_2O_3(s)$ $3MnO_2(s) + 4Al(s) \rightarrow 2Mn(l) + 2Al_2O_3(s)$ / (balancing is optional) (any one equation) (c) (i) $2Cu_2S + 3O_2(g) \xrightarrow{\text{Heat}} 2Cu_2O(s) + 2SO_2(g)$ $2Cu_2O + Cu_2S \xrightarrow{\text{Heat}} 6Cu(s) + SO_2(g)$ **OR** (c)(ii) (I) Because highly reactive metals have more affinity for oxygen than carbon. (II) Because of its low melting point.	**1** **1** **1** **1** **1** **1**	**4**
29.	(a) (i) (I) They do not have charged particles /ions. (II) Soaps react with calcium and magnesium salts present in	 **1** **1**	

	hard water and form insoluble substances called Scum.		
	(III) C-C bonds are strong and stable whereas Si-Si bonds are relatively weak.	**1**	
	(ii) (I) $CH_3CH_2OH \xrightarrow{\text{acidified } K_2Cr_2O_7+\text{heat}} CH_3COOH$	**1**	
	(II) $CH_2{=}CH_2 + H_2 \xrightarrow{Ni} CH_3\text{-}CH_3$	**1**	
	OR		
	(b) (i) X - CH_3COOH/ethanoic acid /acetic acid	½	
	Y - $CH_3COOC_2H_5$/$CH_3COOCH_2CH_3$/ ester/ ethyl ethanoate	½	
	Z - CH_3COONa/sodium ethanoate/sodium acetate	½	
	(ii) Catalyst/ dehydrating agent	½	
	(iii)		
	• $CH_3 - COOH + CH_3 - CH_2OH \rightleftharpoons[\text{Acid}] CH_3 - \underset{\underset{O}{\|}}{C} - O - CH_2 - CH_3 + H_2O$	**1**	
	• Esterification reaction	½	
	• $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$	**1**	
	• Saponification reaction/ De-esterification reaction	½	**5**
	SECTION – C (Physics)		
30.	(A) / Ciliary muscles of your eye contract and the eye lens become thick	**1**	**1**
31.	(C) / - 30 cm and + 30 cm from lens	**1**	**1**
32.	(C) / Assertion (A) is true, but Reason (R) is false.	**1**	**1**
33.	a) r = 0.01 cm=1 x 10^{-4} m		
	l = 1 cm = 0.01 m		
	$R = \rho \frac{l}{A}$	½	
	$\rho = \frac{RA}{l} = \frac{R \times \pi r^2}{l}$		
	$\rho = \frac{7 \times 22 \times 10^{-8}}{7 \times 0.01}$	**1**	
	$\rho = 22 \times 10^{-8} \times 10^{2}$		
	$\rho = 22 \times 10^{-6}\ \Omega m = 2.2 \times 10^{-5}\ \Omega m$	½	
	OR		

	(b) Resistance of electric heater $R = \frac{V}{I}$ $R = \frac{220}{11}$ $R = 20\ \Omega$ $P = \frac{V^2}{R}$ $P = \frac{200 \times 200}{20}$ $P = 2000W / 2\ kW$	½ ½ ½ ½	2
34.	• Convex mirror / Diverging mirror •  (½ mark to be deducted for not showing the direction of light)	**1** **1**	**2**
35.	(a) **Procedure** Take a small aluminium rod AB and using two connecting wires suspend it horizontally from a stand. Place a strong horse-shoe magnet in such a way that the rod lies between the two poles perpendicularly. Connect the aluminium rod in series with a battery and a key. Now pass a current through the aluminium rod from one end to another. / **(Procedure can also be explained with a Diagram)**  **Observation** It is observed that **the rod is displaced** on passing current though it. (b) Magnetic field will be vertically downwards.	**1** **1** **1**	**3**

36.	(a)  (any two cases) / • Magnetic field pattern for a current carrying straight conductor- concentric circles. • Magnetic field pattern for a current carrying solenoid- magnetic field lines similar to that of a bar magnet . • Magnetic field pattern for a current carrying circular loop- a pair of concentric circles with parallel straight lines at the centre. (any two cases) (b) • At X. • Magnetic field decreases as the distance from the conducting wire increases.	**1+1** **½** **½**	**3**
37.	(a) The phenomenon of scattering of light by colloidal particles which makes the path of light visible is called Tyndall effect. (b) Scattered light may appear white. / Scattered light may appear of a colour of longer wavelength. (c) Red colour is least scattered by fog or smoke, so it can be seen in the same colour from a large distance.	**1** **1** **1**	**3**
38.	(a) • Position – Image will form at 40 cm / 2F /C • Nature – Real and inverted / **Alternate answer** f = +20 cm, u = - 40 cm Using Lens Formula $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\frac{1}{v} - \frac{1}{-40} = \frac{1}{20}$ $\frac{1}{v} = \frac{1}{20} + \frac{1}{-40}$ v = + 40 cm Position – 40 cm on the other side of the lens Nature – Real and inverted	**½** **½**	

	(b)  	**1**	
	(c) (i) f_1 = 30 cm = 0.3 m , f_2 = -15cm = -0.15 m $P = \frac{1}{f}$ $P_1 = \frac{+1}{0.3}$ D ; $P_2 = \frac{-1}{0.15}$ D Equivalent power, $P = P_1 + P_2$ P = - 3.33D Equivalent focal length, $f = \frac{1}{P}$ $f = \frac{-1}{3.33}$ = - 0.3 m = - 30 cm **OR**	½ ½ ½ ½	
	(c) (ii) • Combination Lens will behave like convex lens • f_1 = - 2m, f_2 = 1.5m $P = \frac{1}{f}$ $P_1 = \frac{-1}{2}$ D, $P_2 = \frac{+1}{1.5}$ D $P = P_1 + P_2$ $P = \frac{1}{6}$ f = + 6m The focal length of combination is positive. / **Alternate answer** • Combination Lens will behave as a convex lens. • Convex lens – Less 'f', More 'P_1' Concave lens- More 'f', Less 'P_2' Combined Power = P_1+P_2, which will be positive.	**1** **1**	**4**
39.	(a) (i) (I) R_S= 2+2 = 4Ω $\frac{1}{R'} = \frac{1}{4} + \frac{1}{4} = \frac{2}{4}$ R' = 2Ω R'' = R' + 3Ω R'' = 2Ω + 3Ω R'' = 5Ω	½ ½	

(II) $I = \frac{V}{R}$ ½

$I = \frac{10}{5}$

$I = 2A$ ½

(III) $V = IR$

$V = 2 \times 3$

$V = 6V$ **1**

(ii) As the two bulbs are connected in parallel, the voltage across each of them will be the same.

Let I_1 be the current drawn by 100 W bulb:

$I_1 = \frac{P}{V} = \frac{100}{220} = \frac{5}{11}$ A ½

Let I_2 be the current drawn by 60 W bulb:

$I_2 = \frac{P}{V} = \frac{60}{220} = \frac{3}{11}$ A ½

∴ Current drawn from line $I = I_1 + I_2$

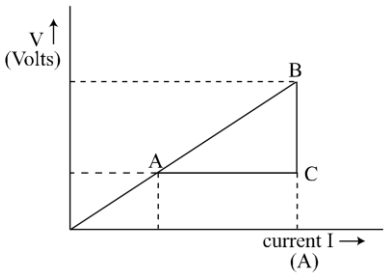
$I = \frac{5}{11} + \frac{3}{11} = \frac{8}{11}$ A = 0.727 A ≈ 0.73 A **1**

Hence, 0.73 A current flows through the line.

OR

(b)

(i)

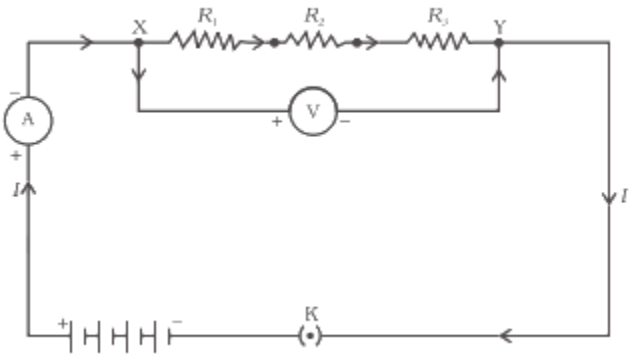
- The Potential difference V across the ends of given metallic wire in an electric circuit is directly proportional to current I flowing through it, provided its temperature remains the same. **1**
- 

1
- Slope $= \frac{BC}{AC}$ **1**

$= \frac{V}{I}$

Thus, Slope = R

(ii) Consider three resistors R_1, R_2, R_3 connected in series. Let V be the potential difference across the resistors and current I flows through the circuit

		½	
	Potential difference across R_1, R_2, R_3 is $V_1 = IR_1$, $V_2 = IR_2$, $V_3 = IR_3$	½	
	If , R_S is equivalent resistance in series combination and I is the current through the circuit then $V = I R_S$ The total potential difference, $V = V_1 + V_2 + V_3$ $IR_S = IR_1 + IR_2 + IR_3$ $R_S = R_1 + R_2 + R_3$	½ ½	**5**