MARKING SCHEME
SCIENCE (Subject Code-086)
(PAPER CODE: 31/1/3) (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>(D) / they reproduce asexually</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>(B) / Trypsin digests proteins and lipase digests emulsified fats.</td><td>1</td><td>1</td></tr>
<tr><td>4.</td><td>(A) / (i) and (iii) respectively</td><td>1</td><td>1</td></tr>
<tr><td>5.</td><td>(C) / Polythene bag, Rubber band, Ball pen</td><td>1</td><td>1</td></tr>
<tr><td>6.</td><td>(D) / (i), (ii) and (iii)</td><td>1</td><td>1</td></tr>
<tr><td>7.</td><td>(D) / Flowers can store some waste products</td><td>1</td><td>1</td></tr>
<tr><td>8.</td><td>(A) / Both, Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).</td><td>1</td><td>1</td></tr>
<tr><td>9.</td><td>(A) / Both, Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)</td><td>1</td><td>1</td></tr>
<tr><td>10.</td><td>(a)
• Bile emulsifies fats for their digestion.
• It makes medium alkaline for further digestion by pancreatic and small intestinal enzymes.

(b) Glucose, water, salt, amino acid</td><td>½
½

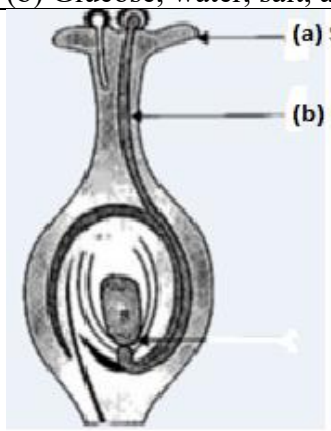
1</td><td>2</td></tr>
<tr><td>11.</td><td> 

Diagram
(a) Stigma
(b) Pollen Tube</td><td>1
½
½</td><td>2</td></tr>
<tr><td>12.</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)</td><td>1
1</td><td></td></tr>
</table>

OR

(b)

Pollination	Fertilization		
i) It is the transfer of pollen grains from anther to the suitable stigma. ii) It occurs in plants.	i) It is the fusion of male gamete with the female gamete. ii)It occurs in both plants and animals.	1 1	
	(any other suitable difference)		2

13. (a)

Nephron	Neuron		
(i) Filtration/Structural/ Functional unit of the kidney. (ii) Filters nitrogenous wastes from the blood.	(i) Structural/ Functional unit of the nervous system. (ii) Transmits information from one part of the body to another.	1	
	(any one, any other suitable difference)		

(b)

Sensory Nerve	Motor Nerve		
(i) Carries impulse from receptors to CNS/ Brain and Spinal cord.	(i) Carries impulse from CNS/Brain and Spinal cord to the motor area/ effector organ.	1	
	(any other suitable difference)		

(c)

Consumers	Decomposers		
(i) Organisms that feed on producers and other consumers. (ii) Transfers energy through the food chain.	(i) Organisms that breakdown dead organic matter into simpler inorganic substances. (ii) Recycle nutrients back into the environment.	1	
	(any one, any other suitable difference)		3

14 (a) (i) Grass **1**

(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. **1**

(c) The base is broad as the number/energy/mass of producers is usually, the highest in comparison to other trophic levels of the pyramid. **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. — **1**

(b) Self-pollination — **1**

(c) (i)

Dominant trait	Recessive trait
i) Expresses itself over recessive trait.	i) Unable to express itself in presence of a dominant trait.
ii) Expresses in both conditions-TT and Tt.	ii) Expresses itself only when it is 'tt' or in pure condition.

2

(any one, any other suitable difference)

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) Most of these bacteria would die, but the few variants resistant to heat would survive and grow further. — **1**

(ii) Fertilization occurs to form a zygote. — **1**

(iii) Cross pollination may occur leading to fruit formation. / No fertilization. / No fruit formation. — **1**

(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. — **1**

(v) The seed will develop into a seedling. / Germination will take place. — **1**

OR

(b)

(i) When spores land on a substance and get adequate moisture and temperature, it will develop into new *Rhizopus*. — **1**

(ii) New plants grow from the buds located in the notches of the leaf. — **1**

(iii) The pollen tube will not be formed. / No fertilisation will take place. — **1**

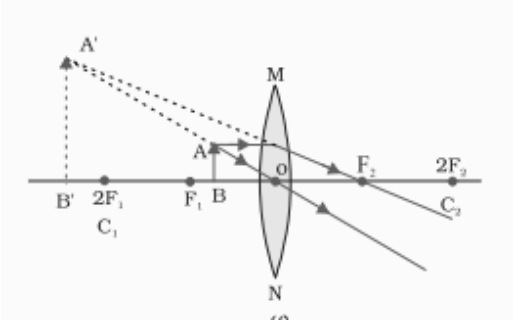
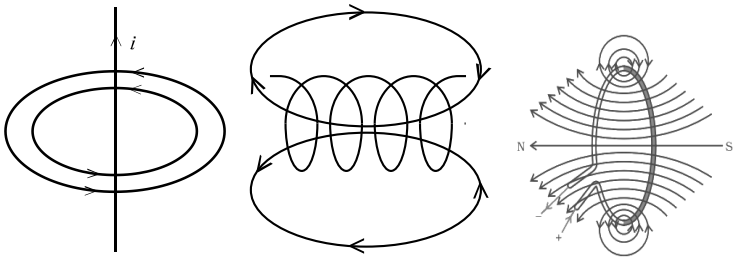
(iv) Fertilization /Pregnancy will be prevented. — **1**

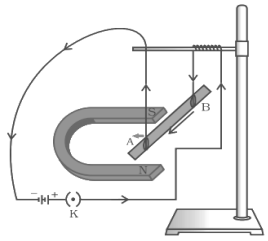
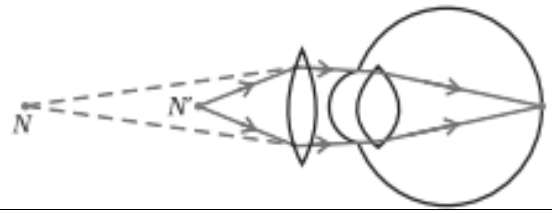
(v) Each fragment or piece grows into a new individual organism. — **1**

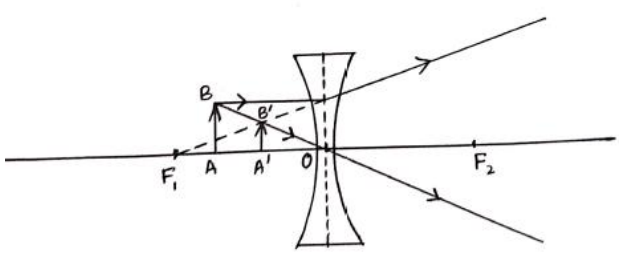
5

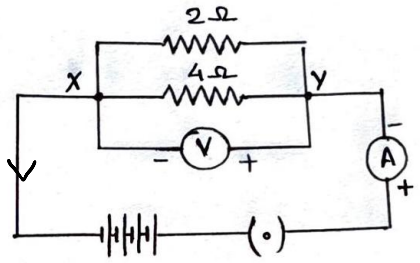
	SECTION-B (Chemistry)		
17.	(D) / NO_2 and O_2	**1**	**1**
18.	(C) / Both, (i) and (ii) are double displacement reactions and precipitation reactions.	**1**	**1**
19.	(B) / Vanilla essence	**1**	**1**
20.	(B)/ alkene	1	1
21.	(B) / Calcium	**1**	**1**
22.	(A) / Pb	**1**	**1**
23.	(A) / tomato, curd, ant-sting	**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.	• Because honey bee-sting leaves an acid. • Being alkaline, baking soda neutralizes the acid.	**1** **1**	**2**
26.	(a) Blue colour of copper sulphate solution changes to pale green $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$ (b) Yellow precipitate is formed. $Pb(NO_3)_2(aq) + 2KI(aq) \rightarrow PbI_2(s) + 2KNO_3(aq)$ (c) White colour of silver chloride changes to grey. $2AgCl \xrightarrow{\text{sunlight}} 2Ag + Cl_2$ (award full marks even if only balanced chemical equation is written)	**1** **1** **1**	**3**
27.	(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**

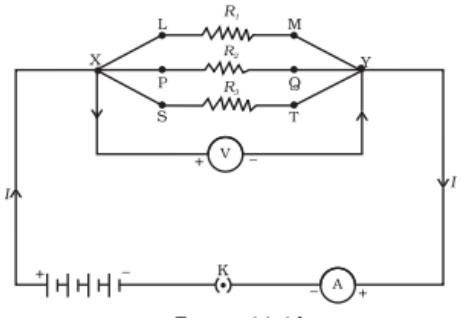
28.	(a) Because it is easier to obtain metal from its oxide. / Because it is easier to reduce metal oxide to metal	**1**	
	(b) $Fe_2O_3(s) + 2Al(s) \rightarrow 2Fe(l) + Al_2O_3(s) + Heat$ $3MnO_2(s) + 4Al(s) \rightarrow 3Mn(l) + 2Al_2O_3(s) + Heat$ (Balancing is optional) (Any one equation)	**1**	
	(c) (i) $2Cu_2S + 3O_2(g) \xrightarrow{Heat} 2Cu_2O(s) + 2SO_2(g)$	**1**	
	$2Cu_2O + Cu_2S \xrightarrow{Heat} 6Cu(s) + SO_2(g)$	**1**	
	OR		
	(c)(ii) (I) Because highly reactive metals have more affinity for oxygen than carbon.	**1**	
	(II) Because of its low melting point.	**1**	**4**
29.	(a) (i)		
	(I) They do not give rise to charged particles/ ions.	**1**	
	(II) Soap reacts with calcium and magnesium salts present in hard water and form insoluble substance called Scum.	**1**	
	(III) C-C bonds are strong and stable whereas Si-Si bonds are relatively weak.	**1**	
	(ii) (I) $C_2H_5OH \xrightarrow{\text{acidified } K_2Cr_2O_7 + heat} CH_3COOH$	**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) • $CH_3 - COOH + CH_3 - CH_2OH \rightleftharpoons^{Acid} CH_3 - \underset{\underset{O}{\|}}{C} - O - CH_2 - CH_3 + H_2O$	**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.	(C) / - 30 cm and + 30 cm from lens	**1**	**1**
31.	(A) / Ciliary muscles of your eye contract and the eye lens become thick	**1**	**1**
32.	(C) / Assertion (A) is true, but Reason (R) is false.	**1**	**1**
33.	 (size of the image is approximate) (½ mark to be deducted for not showing the direction of light)	**2**	**2**
34.	(a) $r = 0.01\ cm = 1 \times 10^{-4}\ m$ $l = 1\ cm = 0.01\ m$ $R = \rho \frac{l}{A}$ $\rho = \frac{RA}{l} = \frac{R \times \pi r^2}{l}$ $\rho = \frac{7 \times 22 \times 10^{-8}}{7 \times 0.01}$ $\rho = 22 \times 10^{-8} \times 10^{2}$ $\rho = 22 \times 10^{-6}\ \Omega m = 2.2 \times 10^{-5}\ \Omega m$ **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 **1** ½ ½ ½ ½ ½	**2**
35.	(a)  (any two cases)	**1+1**	

	/ • 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	 ½ ½	 3
36.	(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**
37.	(a) An eye defect in which a person can see distant objects clearly but cannot see nearby object clearly. (b) The focal length of the eye lens is too long. / The eyeball has become too small. (c) 	**1** **1** **1**	 **3**

38.	(a) • Position - Image will form at 40 cm / 2F /C • Nature – Real, inverted / **Alternate answer** Using Lens Formula $\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$ f = + 20 cm, u = - 40 cm $\frac{1}{v}-\frac{1}{-40}=\frac{1}{20}$ $\frac{1}{v}=\frac{1}{20}+\frac{1}{-40}$ v = + 40 cm Position - 40 cm on the other side of the lens Nature - Real, 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	½ ½ ½ ½	
	OR		
	(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 the combination is positive.	**1** **1**	

	/ **Alternate answer** • Combination Lens will behave like 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.		**4**
39.	(a) (i)  Diagram- 1 mark Labelling – 2 marks	**3**	
	(ii) Potential Difference across the battery for 4 Ω and 2 Ω resistors connected in series, V= I R V = 2 x 6 = 12V Current through 4 Ω resistor in circuit shown in (i), $I = \frac{V}{R}$ $I = \frac{12}{4}$ I = 3A	½ ½ **1**	
	OR		
	(b) (i) $R_A = \frac{V^2}{P_A}$ $R_A = \frac{220 \times 220}{50}$ $R_A = 968\Omega$ $R_B = \frac{V^2}{P_B}$ $R_B = \frac{220 \times 220}{100}$ $R_B = 484\Omega$ $\frac{R_A}{R_B} = \frac{968}{484}$ $R_A : R_B = 2 : 1$	½ ½ **1** **1**	

	(ii)  As in parallel combination, Potential difference applied across each resistor is same. Current flowing through each resistor R_1, R_2 and R_3 is $I_1 = \frac{V}{R_1}; I_2 = \frac{V}{R_2}; I_3 = \frac{V}{R_3}$ If resistance of parallel combination is R_P then current drawn from battery is $I = \frac{V}{R_P}$ Current $I = I_1 + I_2 + I_3$ $\frac{V}{R_P} = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3}$ $\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$	**1** ½ ½	**5**