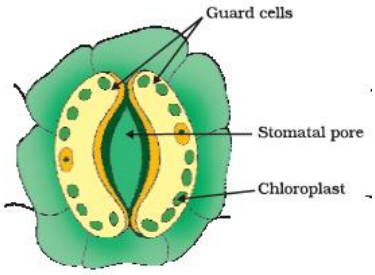
MARKING SCHEME
SCIENCE (Subject Code-086)
(PAPER CODE: 31/3/2) (10-03-86K)

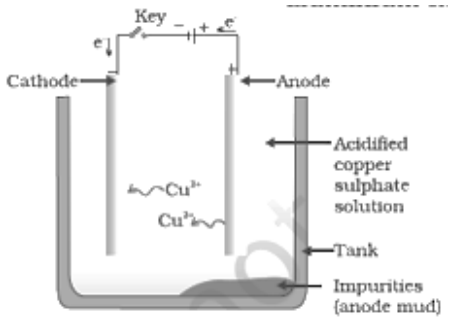
Q.No.	EXPECTED OUTCOMES/VALUE POINTS	Marks	Total Marks
	SECTION – A **(Biology)**		
1.	(B)/ Both plants are covered with separate wooden bell-jars	**1**	**1**
2.	(A)/ Food Web	**1**	**1**
3.	(D)/ Axonal end of one neuron to dendritic end of another neuron	**1**	**1**
4.	(D)/ Rapid cell division in tendril cells that are away from the support	**1**	**1**
5.	(B)/ Human Beings	**1**	**1**
6.	(A) Promote cell division	**1**	**1**
7.	(D) halving of chromosomes at the time of gamete formation.	**1**	**1**
8.	(B)/ Both A and R are true but R is not the correct explanation of A	**1**	**1**
9.	(B)Both A and R are true but R is not the correct explanation of A.	**1**	**1**
10.	• Aerobic Respiration • Complete breakdown of glucose takes place in presence of oxygen releasing more energy.	**1** **1**	**2**
11.	I. (i) 2-chambered (ii) Amphibians/Reptiles (iii) Double circulation II. Double circulation	**½x3** **½**	**2**
12.	Plant → Goat → Man According to 10 % Law, only 10 % of energy from a trophic level is transferred to the next trophic level. So, if Man has 5 J energy then Goat has 5 × 10 = 50 J And plants (producers) have 50 × 10 = 500 Joule	**1** **1**	**2**
13.	(a) All Blue flowers (b) Parents : BB × bb Gametes Ⓑ Ⓑ ⓑ ⓑ F_1 Bb (Blue) Self Pollination Bb × Bb Gametes Ⓑ ⓑ, Ⓑ, ⓑ B b B BB Bb b Bb bb	**1** **1**	

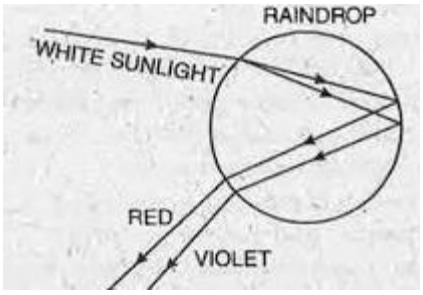
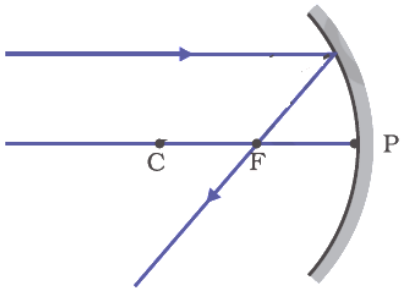
	/ 25% flowers are white (Blue: White= 3:1, ¼ x 100 = 25) (c) BB: bb :: 1: 1	 **1**	 **3**
14.	• Root pressure: Cells in the contact of the soil actively take up ions and creates a difference in concentration between roots and soil, water moves from soil to root to eliminate this difference. • Transpirational pull: Water lost through transpiration from aerial parts of plants, creates a suction which pulls water column from xylem cells of roots.	**½+1** **½+1**	 **3**
15.	(a) (i) Opening of stomata during the day is minimised to prevent loss of water by evaporation. / Transpiration (loss of water in the form of water vapour) is minimised. (ii) Stomata **OR** (b) (i) • Absorption of light energy by Chlorophyll. • Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen. • Reduction of carbon dioxide into carbohydrates. (ii) At night. (iii) Diagram of Open stomatal pore.  Diagram - 1 mark Labelling - 1 Mark	**2** **2** **1** **1** **2**	 **4**
16.	(a) (i) Name: Multiple Fission Type: Asexual reproduction (ii) In stage P, many daughter cells are produced by multiple fission / Repeated nuclear divisions followed by cytoplasmic divisions. (iii) *Plasmodium* (any other) (iv) Vegetative propagation <u>Advantages</u> – • All the plants produced are genetically similar to the parent plant	**½** **½** **1** **½** **½** **1**	

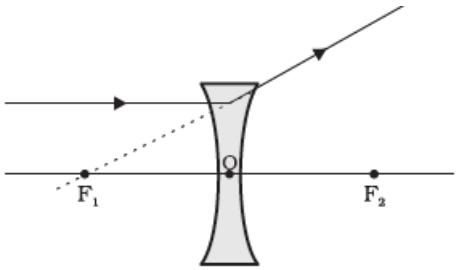
	• Such plants can bear flowers and fruits earlier than those produced from seeds. (any other advantage) **OR** (b) (i) Structure: *Bryophyllum* leaf Type: Asexual reproduction/ vegetative propagation (ii) • Advantage: Genetically identical plants, maintaining desirable traits of the parents. / Bear flowers and fruits earlier than those plants which are grown from seeds / Used for the plants that have lost their capacity to produce seeds. (Any one) • Disadvantage: No genetic variation (iii) As DNA of single parent is involved without gamete fusion. /Offsprings are produced by mitosis hence similar genetic makeup thus no variation. (iv) It creates genetic variation, enhances chances of survival in changing environment and drives evolution.	**1** **½** **½** **1** **1** **1** **1**	**5**

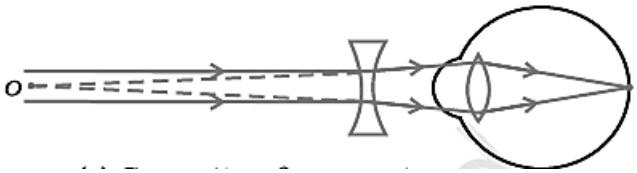
SECTION – B
(Chemistry)

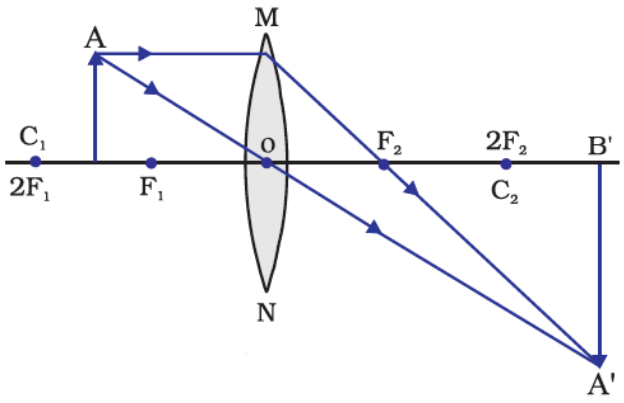
17.	(C)/ Na_2ZnO_2	**1**	**1**
18.	(D)/ Case (iii) only	**1**	**1**
19.	(C)/ Exothermic, but the heat evolved is not sufficient for the hydrogen to catch fire.	**1**	**1**
20.	(B)/ C_4H_8	**1**	**1**
21.	(A)/ 2,2	**1**	**1**
22.	(C)/ Copper (II) chloride, which is blue-green in colour.	**1**	**1**
23.	(B)/ The reaction of a reactive metal with dilute acid.	**1**	**1**
24.	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	**1**	**1**
25.	(i) Hard and brittle solid because of strong force of attraction between positive and negative ions. (ii) High melting and boiling point because a considerable amount of energy is required to break the strong inter-ionic attraction.	**1** **1**	**2**
26.	(i) To prevent the chips from getting oxidised/rancid. (ii) During respiration, glucose combines with oxygen in the cells of our body and gives energy. (iii) To prevent the decomposition of silver chloride into silver and chlorine by sunlight.	**1** **1** **1**	**3**
27.	(a) (i) When acid is added to water, it does not cause excessive local heating/ does not splash out and cause burns. (ii) Because dry HCl does not ionize/produce H^+ ions whereas in dilute HCl, H^+ ions are present. (iii) Because of loss of 5 molecules of water of crystallisation. **OR** (b) (i) $2NaCl(aq) + 2H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g) + Cl_2(g)$	**1** **1** **1** **1**	

	(ii) $NaCl + H_2O + NH_3 + CO_2 \longrightarrow NaHCO_3 + NH_4Cl$ (iii) $CaSO_4.2H_2O \xrightarrow{373K} CaSO_4.\frac{1}{2}H_2O + 1\frac{1}{2}H_2O$ (Deduct ½ mark if no/ incorrect balancing in each case)	1 1	3
28.	(a) During electrolytic refining of a metal, the insoluble impurities which settle down at the bottom of the anode is called anode mud. (b) Anode: Impure copper rod Cathode: Pure copper strip (c) (i) $2Cu_2S + 3O_2(g) \xrightarrow{heat} 2Cu_2O(s) + 2SO_2(g)$ $2Cu_2O + Cu_2S \xrightarrow{heat} 6Cu(s) + SO_2(g)$ **OR** (c) (ii)  (Diagram- 1 mark, Labelling-1 mark)	1 ½ ½ 1 1 2	4
29.	(a) (i) • A series of compounds in which the same functional group substitutes for hydrogen in a carbon chain./ Can be represented by a single general formula and successive members differ by -CH_2 unit or 14u. • C_2H_4 and C_4H_8 belong to the same homologous series/ are alkenes. (ii) (I) $CH_3CH_2OH + CH_3COOH \xrightarrow{Acid} CH_3COOC_2H_5 + H_2O$ (II) $C_2H_5OH + 3O_2 \xrightarrow{Burning} 2CO_2 + 3H_2O$ (balancing may be ignored) (iii) The ionic end of soap interacts with water while the carbon chain interacts with oil/dirt. The soap molecules thus form a structure called micelle. **OR** (b) (i) (I) Propanone/acetone (II) Propyne (ii) Hydrogenation/addition reaction. (iii) C_4H_{10} will have higher melting point, as it has a higher molecular mass than C_3H_8 and melting point increases with the increase in molecular mass.	1 1 1 1 1 ½ ½ 1 1	

	(iv) Sodium ethoxide (C_2H_5ONa) is formed and hydrogen gas is evolved / $2Na + 2CH_3CH_2OH \rightarrow 2CH_3CH_2O^-Na^+ + H_2$ (balancing may be ignored) (v) $CH_3COON\ C_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$	1 ½+ ½	5
	SECTION – C **(Physics)**		
30.	(C) /Colour of ray 1- Red; Colour of ray 2 - Violet	**1**	**1**
31.	(B)/ current becomes $\frac{I}{4}$ and potential difference remains V.	**1**	**1**
32.	(D)/Assertion (A) is false, but Reason (R) is true.	**1**	**1**
33.	(a) (i) Mainly blue coloured light is scattered because very fine particles scatter shorter wavelength. (ii) Scattered light may appear white because very large size particles scatter light of all wavelengths. **OR** (b)  A natural spectrum like rainbow is formed when light ray passes through tiny water droplets. The water droplets disperse the incident sunlight, then reflect it internally and finally refract it again when it comes out of the raindrop. (any other phenomenon of spectrum in nature)	**1** **1** **1** **1**	**2**
34.	(i)  	**1**	

	(ii)  	1	2
35.	(a) (i) Battery / Electric cell (ii) Rheostat / Variable resistance (b) Resistance of the heater, $R = \frac{V}{I}$ $R = \frac{110}{5}$ $R = 22\ \Omega$ Current through the heater, $I' = \frac{V'}{R}$ $= \frac{220}{22}$ $= 10$ A / **Alternate answer for (b)**: • According to Ohm's law, potential difference is directly proportional to current. • When the potential difference is doubled, current will also be doubled. So, value of current will be 10A.	½ ½ ½ ½ 1 1 1	3
36.	(a) 4 Ω and 1 Ω are in series, $R_s = 4\Omega + 1\ \Omega = 5\ \Omega$ Resistance across R and S, $\frac{1}{R_1} = \frac{1}{5} + \frac{1}{5}$ $R_1 = \frac{5}{2}\Omega$ 2 Ω and 3 Ω are in series, $R_{s1} = 2\Omega + 3\ \Omega = 5\ \Omega$ Resistance across P and Q, $\frac{1}{R_2} = \frac{1}{5} + \frac{1}{5}$ $R_2 = \frac{5}{2}\Omega$ Total resistance: $R = R_1 + R_2$ $= \frac{5}{2} + \frac{5}{2}$ $= 5\ \Omega$	1	

	(b) $I = \frac{V}{R}$ $I = \frac{10}{5}$ $I = 2\ A$ (c) $V = I\,R$ $V = 2 \times \frac{5}{2}$ $V = 5\ V$	 **1** **1**	 **3**
37.	(a) • Myopia • The image is formed in front of the retina. (b) • Excessive curvature of the eye lens. • Elongation of the eye ball. (c) 	½ ½ ½ ½ **1**	 **3**
38.	(a) In observation no.3. The object distance is equal to image distance, which is only possible when the object is at 2F (C) =50 cm. So, focal length is 25 cm. (b) • Observation no. 6 • When object is kept between F and O, image formed by lens will be on same side of object. Hence, image distance(v) should be negative. (c) $m = \frac{v}{u}$ $= \frac{150}{-30}$ $m = -5$ Nature of image: Image will be real and inverted Reason: because the value of m is negative. **OR** (c)	**1** ½ ½ ½ ½ ½ ½	



(deduct ½ mark for no or incorrect direction of rays)

2

4

39. (a) (i) (I)

- Fleming's left hand rule. ½
- Stretch the thumb, fore finger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and second finger in the direction of current then thumb will point the direction of force acting on the conductor. 1

(II)

- Right hand thumb rule. ½
- Imagine that you are holding a current carrying conductor in your right hand such that thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of field lines of magnetic field. 1

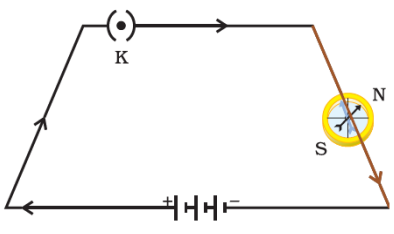
(ii)

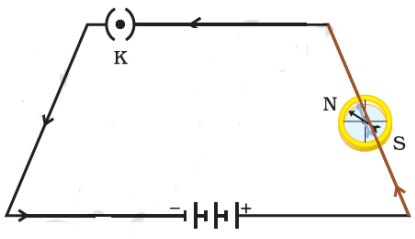
Magnetic field due to bar magnet	**Magnetic field due to current-carrying solenoid**
Strength of magnetic field is constant.	Strength of magnetic field can be changed by changing the magnitude of current.
Direction of magnetic field cannot be changed without changing the orientation of magnet.	Direction of magnetic field can be changed by changing the direction of current.

(any one difference) 2

OR

(b)(i)





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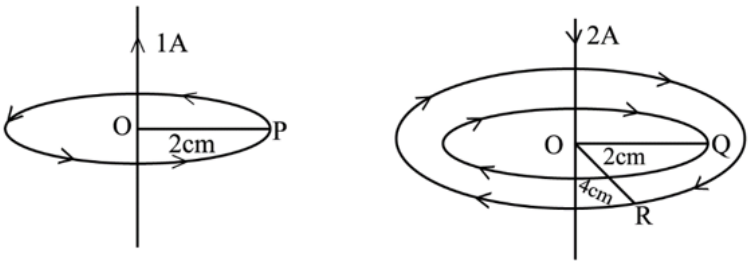
When current passes through a straight conductor, the compass needle placed near it shows deflection. 1

	(ii) (I)  (A) (B) (II) (1) magnetic field strength at Q is more than P. (2) magnetic field strength at Q is more than R.	**1** **½ + ½** **1** **1**	**5**