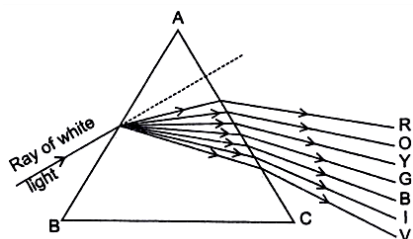## MARKING SCHEME
Secondary School Examination, 2024
SCIENCE (Subject Code–086)
[Paper Code: 31/5/3]

Maximum Marks: 80
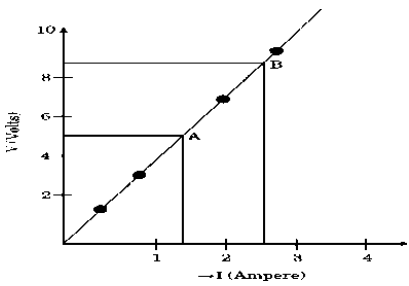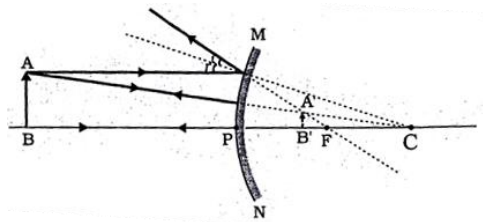
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(A) / (i) and (ii)	1	1
2	(C)/ It has a very small area for glucose and oxygen to pass from mother to the embryo	1	1
3	(D)/basic→ acidic→ basic	1	1
4	(C)/ Receptors in skin →Sensory neuron →Relay neuron → Motor neuron→ Effector muscle in arm.	1	1
5	(C) /2,2,4	1	1
6	(D) / $Fe_2O_3 + 3 CO\rightarrow 2 Fe + 3 CO_2$	1	1
7	(C)/ 7	1	1
8	(B) / Al, Al_2O_3	1	1
9	(D) / Translocation	1	1
10	(A) / Nose	1	1
11	(D)/ Cropland ecosystem	1	1
12	(A) / both pointing into the plane of the paper.	1	1
13	(C) / The brightness of the image will reduce	1	1
14	(B) / Refraction, Dispersion and internal reflection	1	1
15	(A) / Red	1	1
16	(C) / A solenoid	1	1
17	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
18	(A) / Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).	1	1
19	(D) / Assertion (A) is false, but Reason (R) is true.	1	1
20	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
	SECTION B		
21	(a) • Formation of lactic acid in muscles causes cramps. •Aerobic respiration takes place in the presence of oxygen whereas the respiration taking place above is due to lack of oxygen. / End products of aerobic respiration are $CO_2 + H_2O$ +Energy whereas in the above case, Lactic acid + Energy is formed. **OR**	1 1	

	(b)
	• Tissue fluid / Extracellular fluid
	    Functions :
	       i. Carries digested and absorbed fats from the intestine.
	       ii. Drains excess fluid from extracellular space back into the
	            blood.
	       iii. Fight against infections. **(any 2)**
		1
		
		½ + ½
				2

22	C_3H_7OH $= 3 \times 12 + 7 \times 1 + 16 \times 1 + 1$ $= 60u$ Boiling point of alcohols increases from lower to higher homologues	½ ½ 1		2

23	(a) • Copper Oxide
	     • Black
	
	    $2Cu + O_2 \xrightarrow{\text{Heat}} 2CuO$
	  OR
	(b) $BaCl_2 \text{ (aq)} + Na_2SO_4 \text{ (aq)} \rightarrow BaSO_4 \text{ (s)} + 2NaCl \text{ (aq)}$
	    $Ba^{2+}, \ SO_4^{2-}$
		½
		½
		
		1
		
		1
		
		½, ½
				2

24	• Fallopian tube/oviduct • Fertilisation will not take place. • Surgical method/Tubectomy	1 ½ ½		2

25	(a) Concave mirror/ Converging mirror
	(b) Between pole and focus
	(c) • Virtual
	     • Erect
	     • Behind the mirror **(Any two)**
		½
		½
		
		½ + ½
				2

26	$I = 0.5$ A, $t = 2$ hours $= 2 \times 3600$ s $I = Q/t$ $\therefore Q = I \times t = 0.5$ A $\times 2 \times 3600$ s $= 3600$ C	½ ½ 1		2
	SECTION C			
27	(a) Because water breaks up into hydrogen gas and oxygen gas. (b) Endothermic reaction as Electrical energy is required to decompose water.	½ ½ + ½		

	(c) Anode – oxygen; Cathode – hydrogen	½ + ½	
	(d) Mass ratio = 8 : 1	½	3
28			

Food chain	Food web
It is a series of organisms feeding on one another at various levels	It is a network of interconnected food chains/series of branching lines which provides a number of feeding connections amongst different organisms.

		1+1	
	• Population of grass/ first trophic level will increase.	½	
	• Population of tiger/ third trophic level will decrease.	½	3
29	• Auxin	1	
	• When light is coming from one side of the plant, auxin located at shoot tip diffuses towards the shaded side of the shoot.	1	
	• Concentration of auxin in the shaded region stimulates the cells to grow longer as compared to the region exposed to light. So the plant tends to bend towards the light.	1	3
30	• Cinnabar	½	
	• Sulphide ore	½	
	• $2HgS + 3O_2 \xrightarrow{Heat} 2HgO + 2SO_2$	1	
	• $2HgO \xrightarrow{Heat} 2Hg + O_2$	1	3
31	(a) All Plants Tall	½	
	Gene combination: Tt	½	
	(b) It is a recessive trait / it cannot be expressed in presence of dominant trait.	1	
	(c) Tall : Short		
	3 : 1	½	
	Conclusion: Tall trait is dominant and short trait is recessive.	½	3
32	(a) 2000 W heater ,	½	
	For heater, $I_1 = \frac{P}{V}$ =9.09 A ; For Bulb, $I_2 = \frac{P}{V}$ = 0.45 A		
	$I_1 > I_2$	½	
	(b) 100 W bulb		
	$I_2 = \frac{P}{V}$ = 0.45 A	½	
	As it draws only 0·45 A which is less than 1 A.	½	

	(c) 2000 W heater $I_1 = \dfrac{P}{V} = 9.09$ A As the current drawn is 9·09 A which is higher than 5·0 A.		½ ½	3

33	(a)		
	(i) • Hypermetropia	½	
	• Ciliary muscles/ eye lens	½	
	(ii) • Focal length of the eye lens is too long.	½	
	• Eyeball becomes too small.	½	
	(iii) Converging lenses/ convex lens	½	
	They provide the additional focussing power required for forming the image on the retina./ Decrease the focal length of the eye lens	½	
	OR		
	(b)		
	The splitting of white light into its constituent colours is called dispersion.	1	
	Cause: Different colours of white light bend through different angles with respect to incident ray.	1	
		1	3

	SECTION D		
34	(a)		
	• Take two healthy potted plants, A and B of nearly the same size.		
	• Keep them in darkness for three days. (Destarch the plant)		
	• Place a watch glass containing potassium hydroxide by the side of potted plant A but not in potted plant B.		
	• Cover both the plants with separate bell jars and seal the bottom of the jars with Vaseline.		
	• Keep both the plants in sunlight for two hours.		
	• Pluck one leaf each from both the plants and test for the presence of starch with iodine solution.	½ x 6	
	• <u>Observation</u>: The leaf of the potted plant A with KOH did not turn blue – black. The leaf of the potted plant B turns blue.	1	
	• <u>Conclusion</u>: KOH absorbs CO_2 so photosynthesis did not occur in potted plant A.	1	

	OR		
	(b)		
	(i) In set up (I) lime water turns milky in more time as compared to set up (II) because the air we exhaled contains high percentage of CO_2 as compared to atmospheric air.	1,1	
	(ii)		
	Open Stomatal Pore	1	
	Two labellings : (I) Guard Cells (II) Chloroplast Two functions performed by stomata :	½ ½	
	• Gaseous exchange • Transpiration	½ ½	
			5
35	(a) (i) The molecules of water of crystallisation in ferrous sulphate crystals get evaporated on heating.	1	
	(ii) Green $\longrightarrow$ White	½	
	(iii) Seven / ($FeSO_4 \cdot 7H_2O$) (I) $CuSO_4 \cdot 5H_2O$ (II) $Na_2CO_3 \cdot 10H_2O$	½ ½ ½	
	(iv) • On heating gypsum ($CaSO_4 \cdot 2H_2O$) at 373 K it loses water molecules/ $CaSO_4 \cdot 2H_2O \xrightarrow[373\ K]{\Delta} CaSO_4 \cdot \tfrac{1}{2}H_2O + 1\tfrac{1}{2}H_2O$	1	
	Two uses of plaster of Paris: • Making toys / material for decoration • Supporting fractured bones **(or any other)**	½ , ½	
	OR		

	(b)			
	(i) X-Tartaric acid	½	
	Y-Baking soda	½	
	Z- Baking powder	½	
	Y-$NaHCO_3$	½	
	(ii)		
	$NaCl + H_2O + CO_2 + NH_3 \longrightarrow NH_4Cl + NaHCO_3$	1	
	$NaHCO_3 + H^+ \longrightarrow CO_2 + H_2O + $ Sodium salt of acid	½	
	CO_2 released during heating makes the cake soft and spongy	½	
	(iii) Magnesium hydroxide; $Mg(OH)_2$	1	
			5

36	(a) (i) Parallel Circuit	1	
	• Each electrical appliance has its own switch due to which it can be turned ON and OFF separately.		
	• If one electrical appliance stops working, others remain unaffected.	½ +½	
	• Each appliance has equal potential difference and draws current as per its requirement.		
	• The total resistance in parallel circuit decreases. (any two)		

(ii)   Combined resistance of the series,

$R_1 = 6\ \Omega + 6\ \Omega = 12\ \Omega$ ... ½

Combined resistance of parallel grouping of 6 Ω and $R_1 = 12\ \Omega$,
resistors is R_2, where

$$\frac{1}{R_2} = \frac{1}{6} + \frac{1}{12} = \frac{9}{20}$$

$R_2 = 4 \cdot 0\ \Omega$ ... ½

Total resistance of circuit = R = $3 + 4 + 3 = 10\ \Omega$ ... 1

Current flowing = I = $\dfrac{V}{R}$ ... ½

$$= \frac{4 \cdot 5\ V}{10\ \Omega}$$

$= 0 \cdot 45\ A$ ... ½

OR

(b) (i)		1	
	(ii) Resistance of resistor $= \dfrac{V_2 - V_1}{I_2 - I_1} = \dfrac{8 \cdot 3 - 5 \cdot 2}{2 \cdot 5 - 1 \cdot 5} = 3 \cdot 1 \; \Omega$	1+1	
	(iii) The given resistor obeys Ohm's law./ Resistance remains constant.	1	
	(iv) Because when the value of V = 0, the current I = 0.	1	5

SECTION E

37			
	(a) It is straight line passing through the pole and centre of curvature of a concave mirror.	1	
	(b) Radius of curvature ,R= 20 cm	1	
	(c) (i) u = −10 cm, f = +15 cm	½	
	$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$	½	
	$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{15} - \frac{1}{-10}$$ $$\frac{1}{v} = \frac{1}{6}$$ $$\Rightarrow v = + 6 \text{ cm}$$	1	
	OR		
	(c) (ii) Convex mirror / Diverging mirror	½	
		1 ½	
	[Note: Deduct ½ mark if direction of rays is not shown]		4
38	(a) Compounds formed by carbon and hydrogen only. (b) Tetravalency and Catenation	1 1	

	(c) (i) (1) $-C{\overset{H}{\underset{O}{\diagdown}}}$ (2) $-\overset{\overset{O}{\|}}{C}-$	½ +½	
	$CH_3COOH + C_2H_5OH \xrightarrow{\text{Acid}} CH_3COOC_2H_5 + H_2O$ Ester	1	
	OR		
	(c) (ii) Compounds with identical molecular formula but different structures Two isomers of butane C_4H_{10}	1	
		1	
		½ +½	4

39			
	(a)		
		Self-pollination	Cross-pollination	
		Transfer of pollen grains from anther to the stigma of the same flower.	Transfer of pollen grains from the anther of one flower to the stigma of another flower.	1
		½ + ½	
	(b) Petals, they dry and fall off.		

	(c) (i) Fusion of male and female gametes to form a zygote
	     Ovule – Seed,
	     Ovary – fruit
		1
		 ½
		 ½	

	OR		

	(c) (ii) Future shoot – Plumule,
	        Future root – Radicle
	        Cotyledon – Stores food.
		½
		 ½
		 1	

			4