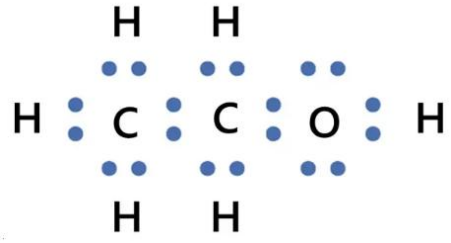
SCIENCE – Code no. 086
MARKING SCHEME
CLASS – X (2026-27)

Section – A		
1	A. Carbon dioxide gains hydrogen, while water loses electrons.	1
2	C. R *For visually impaired students* B. The leaf kept in darkness will show the presence of starch	1
3	A. Glucose and salts	1
4	C. They will not produce any seeds or fruits.	1
5	C. The successful meeting and fusion of the male and female gametes	1
6	B. 17, 34	1
7	C. Secondary Consumer	1
8	D. A is false but R is true.	1
9	D. A is false but R is true	1
10	The Bile juice from the liver makes the food alkaline for the pancreatic enzymes to act. In addition, bile salts break down fats into smaller globules increasing the efficiency of enzyme action. If bile duct is obstructed, it can lead to improper digestion of fats. (0.5+0.5) Herbivores eating grass need a longer small intestine to allow the cellulose to be digested. Meat is easier to digest, hence carnivores like tigers have a shorter small intestine. (1)	2
11	The actions on which we do not have any thinking control are controlled by the mid-brain and hind-brain. These are called involuntary actions. Examples (any two) blood pressure, salivation and vomiting **OR** The information of touch is communicated by electrical-chemical means from cell to cell. Plant cells change shape by changing the amount of water in them, resulting in swelling or shrinking, thus changing shapes and causing movement.	2
12	• Uterine lining thickens and is richly supplied with blood vessels to nourish the embryo. • Placental connection is developed between the uterus and embryo.	2

13	• When a nerve impulse reaches the muscle, the muscle cells will move by changing their shape so that they shorten. • Muscle cells have special proteins that change both their shape and their arrangement in the cell in response to nervous electrical impulses. • When this happens, new arrangements of these proteins give the muscle cells a shorter form.	3
14	A. 10000 KJ B. No, the loss of energy at each step is so much that very little usable energy will be left. C. Large fish, due to biological magnification of pesticide.	3
15	A. In experiment one, in F1 all plants (100%) will have violet (Vv) flowers and in F2, 75% (3/4) plants will have violet flowers (1/4 VV and 2/4Vv) because violet colour of the flower is a dominant trait in pea plant. (1) B. 3/16 or 18.75% pea plants will have tall height and white flowers (vvTT/vvTt)– a combination of a dominant and a recessive trait. (1) *Attempt sub - part C or D.* C. In pea plants, no half way characteristics are produced because even a single copy of T or V will produce the same result as two copies of T or V. Thus, no plants with medium height and light violet flowers will be produced in F1 or F2 generation (zero percent). (2) **OR** D. In F1 generation all plants will have only dominant traits so no plant with short height and white flowers (recessive traits) will be produced (zero percent). In F2 generation 1/16 or 6.25 % plants will have short height with white flowers (vvtt) as both these traits are recessive. (2)	4
16	*Student to attempt either option A or B.* A. I. C – Four chambered heart. (1) The separation of the right side and the left side of the heart is useful to keep oxygenated and deoxygenated blood from mixing. Such separation allows a highly efficient supply of oxygen to the body. This is useful in animals that have high energy needs, such as birds and mammals, which constantly use energy to maintain their body temperature. (2) II. A – Two chambered heart. (1) The blood is pumped to the gills, is oxygenated there, and passes directly to the rest of the body. Thus, blood goes only once through the heart in the fish during one cycle of passage through the body. (1) **OR**	5

	B. I. A depicts inhalation. (1) · Ribs get lifted (0.5) · Diaphragm is flattened, (0.5) · The chest cavity becomes larger (0.5) · Air is sucked in. (0.5) II. In human beings, the respiratory pigment haemoglobin has a very high affinity for oxygen. This pigment is present in the red blood corpuscles. This oxygen-rich blood is then pumped by the heart to the rest of the body. (2) <u>*For visually impaired students*</u> I. Four chambers are present. (1) The separation of the right side and the left side of the heart is useful to keep oxygenated and deoxygenated blood from mixing. Such separation allows a highly efficient supply of oxygen to the body. This is useful in animals that have high energy needs, such as birds and mammals, which constantly use energy to maintain their body temperature. (2) II. Two chambered heart. (1) The blood is pumped to the gills, is oxygenated there, and passes directly to the rest of the body. Thus, blood goes only once through the heart in the fish during one cycle of passage through the body.(1) **OR** I. · Ribs get lifted (0.5) · Diaphragm is flattened, (0.5) · The chest cavity becomes larger (0.5) · Air is sucked in. (0.5) The exchange of gases can take place on the surface, which is provided by the alveoli. The walls of the alveoli are supplied with an extensive network of blood vessels. - So lungs maximize the area for a gaseous exchange through the presence of large numbers of alveoli which are richly supplied with blood. (1) II. In human beings, the respiratory pigment haemoglobin has a very high affinity for oxygen. This pigment is present in the red blood corpuscles. This oxygen-rich blood is then pumped by the heart to the rest of the body. (2)	
Section – B		
17	C. physical change because the space between crystals is adjusted. No new substance is formed in this process, only the spacing between crystals changes that alters the wavelength of light reflected.	1

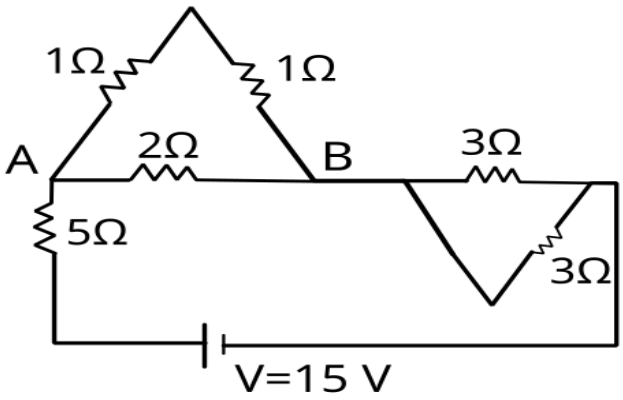
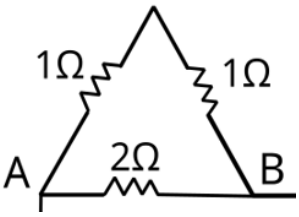
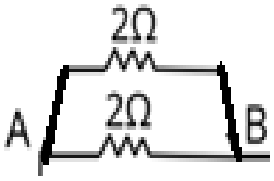
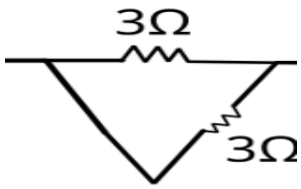
18	B. I and III II & IV are incorrect as Chlorine is produced at the anode, but it is not used to make margarine. And sodium hydroxide is deposited near cathode.	1
19	A. Ca^{2+} and Mg^{2+} ions react with soap, forming insoluble compounds, whereas detergents do not form such insoluble salts.	1
20	D. (i), (ii) and (iv) Plaster of Paris is $CaSO_4.1/2\ H_2O$, Washing soda $Na_2CO_3.10\ H_2O$ Baking soda $NaHCO_3$ and Gypsum is $CaSO_4.2H_2O$	1
21	A. The compounds in this pair have same molecular formula but different structural formula. *For visually impaired students* A. Propene	1
22	C. nitrogen, In the label E304 and E307b are antioxidants. Nitrogen is also used as an antioxidant. *For visually impaired students* C. antioxidant	1
23	C. do not corrode easily as aluminium oxide forms a protective layer.	1
24	B. Both A and R are true, and R is not the correct explanation of A.	1
25	Carbon forms millions of compounds because it has small atomic size, therefore, it forms strong and stable C–C bonds, showing extensive catenation. Silicon, being larger in size, forms weaker Si–Si bonds and cannot show catenation to the same extent, so it forms fewer compounds.	2
26	*Attempt either option A or B.* A. (i)  (1)	3

	(ii) Propanol, C_3H_7OH (0.5+0.5) (iii) $C_2H_5OH + CH_3COOH \xrightarrow{\text{conc. } H_2SO_4} CH_3COOC_2H_5 + H_2O$ (1) **OR** B. (i) Product A – Ethene, Product B – Ethane (0.5+0.5) (ii) $CH_3CH_2OH \xrightarrow{\text{conc. } H_2SO_4} CH_2=CH_2 + H_2O$ (1) $CH_2=CH_2 + H_2 \xrightarrow{Ni} CH_3CH_3$ (1) *For visually impaired students* A. (i) Ethanol (1) (ii) C_3H_7OH (1) (iii) $C_2H_5OH + CH_3COOH \xrightarrow{\text{conc. } H_2SO_4} CH_3COOC_2H_5 + H_2O$ (1) **OR** B. (i) Product A – Ethene, Product B – Ethane (0.5+0.5) (ii) $CH_3CH_2OH \xrightarrow{\text{conc. } H_2SO_4} CH_2=CH_2 + H_2O$ (1) $CH_2=CH_2 + H_2 \xrightarrow{Ni} CH_3CH_3$ (1)	
27	A. A sports drink contains ions (electrolytes) which help conduct electricity. Coconut oil does not contain ions so it cannot conduct electricity. (1) B. Limewater turns milky due to the formation of insoluble calcium carbonate ($CaCO_3$). When excess CO_2 is passed, calcium carbonate reacts further to form soluble calcium hydrogen carbonate, causing the milkiness to disappear. (1) C. Air near the sea contains high moisture (humidity), which speeds up rusting. In a dry hilly region, moisture is low, so rusting occurs much slowly. (1)	3
28	A. Silver (1) B. (ii) 20 s (1) *Attempt either sub-part C or D.* C. Yes, the time required for candles to drop will increase for all the metals. The order of falling of candles will remain the same. Particles vibrate and transfer heat to one another in conduction. Conduction of heat will take more time from one end to the other because heat has to travel through a longer distance. (2) **OR** D. No, if the thickness of rods is changed the inference will not be correct. The dimensions of the rods have to be the same. A thicker rod will take more time to conduct heat. (2)	4

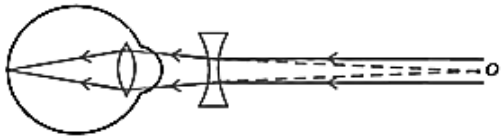
	For visually impaired students A. Metal B (1) B. (ii) 20 s (1) *Attempt either sub-part C or D.* C. Yes, the time required for sensor to beep will increase for all the metals. The order of falling of pins will remain the same. Particles vibrate and transfer heat to one another in conduction. Conduction of heat will take more time to travel from one end to the other, as longer distance has to be covered by heat energy. (2) **OR** D. No, if the thickness of rods is changed the inference will not be correct. The dimensions of the rods have to be the same. A thicker rod will take more time to conduct heat. (2)	
29	*Student to attempt either option A or B.* A. I. Drishti.(Alisha and Bhushan are partially correct) (1) Oxidation and reduction go hand in hand. In case of formation of ammonia, nitrogen is getting reduced and hydrogen is oxidised. In case of rusting of iron, iron is getting oxidised while oxygen gets reduced. (2) II. (i) $MgCl_2 + 2AgNO_3 \rightarrow 2AgCl + Mg(NO_3)_2$ (1) (ii) $2Al + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 3H_2$ (1) **OR** B. I. Both have understood decomposition partially. Decomposition reaction is when a single substance breaks down into simpler substances. The single substance undergoing decomposition has to be a compound while the products formed can be either elements or compounds. $MgCO_3$ decomposes on heating to magnesium oxide and carbon dioxide even when both products formed are compounds, it is decomposition. (2) Water on electrolysis gives hydrogen and oxygen both are elements. It is also a decomposition reaction. (1) II. (i) Incorrect observation, iron is less reactive than Mg so it cannot displace magnesium. (1) (ii) Hydrogen gas is formed, which produces few bubbles. Brisk effervescence is formed when carbon dioxide is formed. (1)	5

Section – C		
30	B. Hold the lens above a sheet of paper and adjust until the smallest, brightest spot is formed.	1
31	C. 4.0 A	1
32	A. Both A and R are true, and R is the correct explanation of A.	1
33	A. The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for the given pair of media. (1) B. Consider a ray of light travelling from medium 1 into medium 2.Let v_1 be the speed of light in medium 1 and v_2 be the speed of light in medium 2. The refractive index of medium 2 with respect to medium 1 is given by (n_{21}) $n_{21} = \frac{v_2}{v_1}$ (1)	2
34	<u>*Student to attempt either A or B.*</u> A. I. Joule's law of heating: The heat produced in a resistor is (i) directly proportional to the square of current for a given resistance, (ii) directly proportional to resistance for a given current, and (iii) directly proportional to the time for which the current flows through the resistor. $H = I^2Rt$, where 'I' is current and 'R' is resistance. (1) II. If resistance is doubled: For the same current I, heat H becomes $H = I^2(2R)t = 2I^2Rt = 2H$, i.e. heat doubles. (1) **OR** B. I. Definition: The resistivity (ρ) of a material is defined as the resistance of a wire having unit cross-sectional area and unit length $R = \frac{\rho L}{A}$,where R is resistance of a wire of length L and cross-sectional area A (1) II. Intrinsic property justification: Resistivity depends only on material (not on dimensions). Example: Two copper wires of different lengths and thick-nesses yield the same ρ when computed using R*A/L. (1)	2

35	A. Object distance u = 24 cm (in front of lens). Type of lens: Concave (diverging) lens (given). (1) B. Image distance, v: Magnification $m = \frac{h_i}{h_o} = \frac{v}{u}$. For a concave lens the image is upright and diminished, so, $m = +\frac{1}{3}$. Using sign convention $m = -24\ cm$, $v = mu = \frac{1}{3} \times (-24) = -8\ cm.$ (1) Thus, the image is located 8 cm on the same side of the lens as the object (virtual image). C. Focal length f : Use lens formula $$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$ Substitute, $v = -8\ cm,\ u = -24\ cm$: $$\frac{1}{f} = \frac{1}{-8} + \frac{1}{-24} = -\frac{1}{8} + \frac{1}{24} = -\frac{3+1}{24} = -\frac{2}{24} = -\frac{1}{12}$$ So, $f = -12\ cm$ (1) - - - - - - - - - - - - *For visually impaired students* If a student places an object 24 cm from a convex lens of focal length 12 cm, then $$\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$ $$\frac{1}{12} = \frac{1}{v} - \frac{1}{-24}$$ $= \frac{1}{12} - \frac{1}{24} = \frac{2-1}{24} = \frac{1}{24} = v = 24\ cm,$ (2) And, the image is real (on the opposite side) at 24 cm. (1)	3
36	A. Right-hand thumb rule: Imagine that you are holding a current-carrying straight conductor in your right hand such that the thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field. (1) If the thumb of the right hand points in the direction of conventional current, the curled fingers indicate the direction of the magnetic field lines around the conductor. This helps determine the direction of the magnetic field. (1) B. Variation with distance: Magnetic field magnitude around a long straight conductor at distance r falls as $$B \propto \frac{I}{r},$$ i.e. it decreases inversely with distance from the conductor. (1)	3

37	A.  1 Ω and 1Ω are in series and the combination is in parallel with 2 Ω   $\frac{1}{R} = \frac{1}{2} + \frac{1}{2}$ R_{AB} =1 Ω  $\frac{1}{R} = \frac{1}{3} + \frac{1}{3}$ R = 1.5 Ω 5 Ω , 1 Ω and 1.5 Ω are in series: R_s = 5 + 1+1.5 R_s = 7.5 Ω V = I R 15 V = I* 7.5 I = 2A (2) B. R_{AB}= 1 Ω, net current between points A and B is 2A $V_{AB}=I_{AB} * R_{AB}$ V_{AB}= 2 *1 = 2V (1) - - - - - - - - - - - - *For visually impaired students* A. Total Resistance: $R_{\text{total}} = 2 + 3 + 5 = 10\ \Omega$ (1) B. Total current:	3

	$I = \frac{V}{R_{\text{total}}} = \frac{15}{10} = 1.5\ A.$ (1) C. Voltage drop across the 3 Ω resistor: $V_{3\ \Omega} = I \times 3 = 1.5\ \times 3 = 4.5\ V$ (1)	
38	A. An iron core placed inside the solenoid concentrates and amplifies the magnetic field, producing a stronger pulling force on the bolt. (1) B. Using the right-hand thumb rule(Curl the fingers of your right hand in the direction of current, then the direction of thumb will point towards the direction of north pole of the solenoid) Use a bar magnet with a known north pole towards one of the ends of the solenoid, Repulsion will indicate North pole. (1) C. If current increases then the magnetic field B inside a solenoid will also increases as magnetic field is directly proportional to current. As the magnetic field increases, a stronger magnetic pull unlocks the door more effectively. (2) **OR** D. Increase the number of turns N of the coil, reduce coil length, or insert a soft iron core. (any two points) (2) <u>*For visually impaired students*</u> A. The compass needle is influenced by the magnetic field developed by the current carrying conductor. Hence it shows a deflection. (1) B. It aligns itself with the Earth's magnetic field in the north–south direction. (1) C. The deflection increases with the increase in the amount of current as Magnetic Field in a current carrying conductor is directly proportional to the current flowing through the conductor. (2) **OR** D. The Right-Hand Thumb Rule explains the reversed compass deflection. When current direction reverses, the magnetic field's direction reverses (fingers curl the opposite way), causing the compass needle (a tiny magnet) to align with the new field, thus deflecting oppositely, showing that the magnetic field is now in the opposite direction. (2)	4
39	<u>*Students to attempt either option A or B.*</u> A. I. Accommodation: Ability of the eye lens to change its focal length to focus objects at different distances on the retina. (1) II. Near point: The nearest point (about 25 cm for a normal eye) at which an object can be seen distinctly; it signifies the closest comfortable focus. (1) III. Lens for defect (cannot see distant objects): A diverging (concave) lens is used to correct myopia (short-sightedness). (1) IV. Diagram:	5



(2)

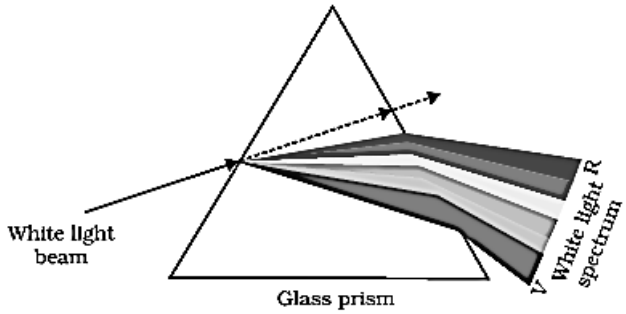
B.

I. Dispersion: Splitting of white light into its component colours due to wavelength-dependent refraction. (1)

II. Colour deviating least in prism: Red deviates least (longest wavelength). (1)

III. Sky dark in space: No atmosphere to scatter sunlight — space appears dark. (1)

IV. Diagram:



(2)

- - - - - - - - - - - -

For visually impaired students

A.

I. Hypermetropia is a defect of vision in which a person can see distant objects clearly but cannot see nearby objects clearly. (1)

II. The far point of a normal human eye is at infinity. It signifies that a normal eye can see objects clearly even when they are extremely far away. (1)

III. A convex (converging) lens is used to correct hypermetropia. (1)

IV. A hypermetropic eye cannot focus nearby objects on the retina because:

a) The eyeball is too short, or

b) The eye lens is not converging enough (insufficient curvature) As a result, the image of a nearby object forms behind the retina, instead of on it. A convex lens is used to increase the convergence of light so that the image forms on the retina. (2)

OR

B.

I. The earth's atmosphere is a heterogeneous mixture of minute particles. These particles include smoke, tiny water droplets, suspended particles of dust and molecules of air. When a beam of

	light strikes such fine particles, the path of the beam becomes visible. The phenomenon of scattering of light by the colloidal particles gives rise to Tyndall effect. (2) II. Violet light has the shortest wavelength. (1) III. Red light is least scattered by air because it has the longest wavelength. It remains visible over long distances even in fog, smoke, or dust. Hence, red is chosen for alert and stop signals. (1) IV. Sunlight is white but when it enters the atmosphere, the smaller particles of air scatter shorter wavelengths (blue and violet) more strongly than others. Our eyes are more sensitive to blue than violet, so the sky appears blue. (1)	

****