EDUTECH ACADEMY

Preliminary Examination [MODEL ANSWER]

Std: SSC (E.M) **Subject: Science & Technology I** **Time: 2 Hours**

Date : 22/Jan/2026 **Max Marks: 40**

1. It is necessary to solve all the questions.
2. Draw neat and labelled diagrams wherever necessary.
3. Start every new main question on separate page.
4. Figures on the right indicate marks.
5. For each Multiple Choice Question (1.B), ONLY first answer will be considered.
6. Write answer of each MCQ with option number.

Eg. i) a……. ii) c……..

Q.1 (A) Choose the proper alternative and fill in the blanks: **5**

(1) Ans. (a) Group 2

(2) Ans. (a) focal length

(3) Ans. (c) low earth Orbit

(4) Ans. (b) acetic acid

(5) Ans. (b) space mission

(B) Attempt the following: **5**

(1) Find the odd one out: **1**

Ans. laws of planetary motion

(2) State 'True' or 'False', if 'False' correct it: **1**

Ans. True

(3) Write the correlated terms: **1**

Ans. Persistence of vision

(4) Name the following: **1**

Ans. Propanoic acid

(5) Answer the following in one line: **1**

Ans. Farsightedness or hypermetropia

Q.2 (A) Give reasons:(Any Two) **4**

(1) Ans. 1. Atomic radius goes on increasing down a group because while going down a group a new shell is added.
2. Therefore the distance between the outermost electron and the nucleus goes on increasing.
3. As a result of this the atomic size increases in spite of the increased nuclear charge.

(2) Ans. 1. When we drop a feather and a heavy stone at the same time from a height, the feather experiences a buoyant force and a frictional force due to air and therefore floats and reaches the ground slowly.
2. But, the buoyant and frictional forces on the stone are much less than the weight of the stone and does not affect the speed of the stone much.
3. Hence, when we drop a feather and a stone at the same time from a height, the stone reach the earth faster than a feather.

(3) Ans. i. The velocity of light in a medium depends on the frequency of light and thus different colours travel with different velocity.
ii. Therefore, the refractive index of a medium is different for different colours. It is maximum for violet light and minimum for red light.
iii. The angle of deviation of ray of light on passing through a prism depends on the refractive index of the material of the prism. Hence, violet light is deviated the most and red light is deviated the least on passing through a prism.

(B) Answer the following:(Any Three) **6**

(1) Ans. **Given:** Mass of the earth = $m_1 = 6 \times 10^{24}$ kg

Radius of the earth = $R = 6.4 \times 10^6$ m

Mahendra's mass = $m_2 = 75$ kg

$G = 6.67 \times 10^{-11}$ Nm^2/kg^2

Using the force law, the gravitational force on Mahendra due to earth is given by

This force is 1.83×10^9 times larger than the gravitational force between Mahendra and Virat.

$$F = \frac{G\, m_1 m_2}{R^2}$$

$$F = \frac{6.67 \times 10^{-11} \times 75 \times 6 \times 10^{24}}{(6.4 \times 10^6)^2}\ N = 733\ N$$

(2) Ans.

AC generator	DC generator
1. In AC generator current flows out in different directions.	1. In DC generator current flows out in same directions.
2. It converts mechanical energy into electrical energy in the form of alternating current.	2. It converts mechanical energy into electrical energy in the form of direct current.

(3) Ans. (i) The force of attraction which holds the atoms together in a molecule in order to attain the stable electronic configuration of the nearby noble gas and obtain stability is called chemical bond.
(ii) Ionic and covalent bonds are the two important types of chemical bonds.

(4) Ans. As we go higher than the sea level, the melting point of solids
(i) which expands on melting get lowered due to decreases of pressure.
(ii) which contracts on melting will increase due to decrease of pressure.

(5) Ans. $C_{12}H_{22}O_{11} \xrightarrow{\text{Heat}} 12C + 11H_2O$

Q.3 Answer the following:(Any Five) **15**

(1) Ans. Step 1) Write chemical equation

$$NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$$

Step 2) Compare number of atoms of each element on each side.

Elements	Number of atoms on reactant side	Number of atoms on product side
Na	1	2
O	5	5
H	3	2
S	1	1

Step 3) Start balancing and write balanced equation.

Elements	Number of atoms on reactant side	Number of atoms on reactant side
Na	2	2
O	6	6
H	4	4
S	1	1

$$2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$$

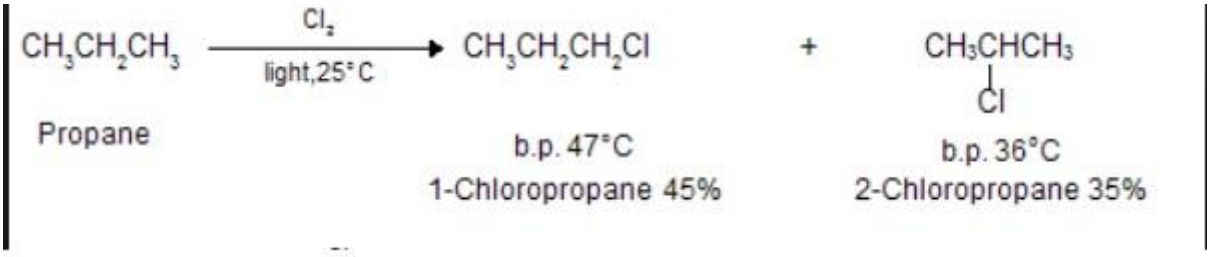
(2) Ans. Artificial satellite is a man-made device orbiting around the earth, moon or another planet transmitting to earth scientific information or used for communication.
Two types of Artificial satellites :
1) Weather satellite : Help to predict weather.
ex. TIROS, COSMOS
2) Communication satellite :
Allow telephone and data conversations to be relayed through satellite ex. Telstar, Intelsat.

(3) Ans.

Nearsightedness	Farsightedness
1. It is defect in which a human eye can see nearby objects clearly but is unable to see distant objects clearly. 2. The image of the distant object is formed in front of retina. 3. The distance between eye lens and retina increases as eyeball is lengthened or lens is curved. 4. It is corrected by using concave lens of suitable focal length.	1. It is defect in which a human eye can see distant objects clearly but is unable to see nearby objects clearly. 2. The image of the nearby object is formed behind the retina. 3. The distance between eye lens and retina decreases as eyeball is shortening of eyeball or flattening of lens. 4. It is corrected by using convex lens of suitable focal length.

(4) Ans. 1. The sulphide ores are strongly heated in air to transform them into oxides. This process is called roasting.
2. Carbonate ores are strongly heated in a limited supply of air to transform them into oxides. This process is called calcination.
3. Carbon and sodium.

(5) Ans.



(6) Ans. A product is a substance that is formed as the result of a chemical reaction between reactants. Reactants are starting material of the reaction which interacts with each other to form product. For example -

$CuSO_4$ (aq) + Pb(s) $\rightarrow PbSO_4$+ Cu

In the above equation copper sulphate and lead are reactants. They react with each other to form copper and lead sulphate as products.

(7) Ans. **Given**: Specific heat of copper = 0.1 cal/g °C

And so specific heat of calorimeter= 0.1 cal/ g ^{0}C

Suppose the copper ball water and the calorimeter attain final temperature T.

Heat lost by solid object = heat gained by water in calorimeter + heat gained by the calorimeter.

Here, heat lost by the copper ball = mass of the copper ×specific heat of copper × decrease in temperature of the ball

$Q = 100 \times 0.1 \times (100 - T)$

Similarly,

Heat gained by the water = mass of the water X its specific heat X increase in its temperature

$Q_1 = 195 \times 1 \times (T - 20)$ and

Heat gained by the calorimeter = mass of the calorimeter × its specific heat × increase in its temperature

$Q_2 = 50 \times 0.1 \times (T - 20)$

$Q = Q_1 + Q_2$

$100 \times 0.1 \times (100 - T) = 195 \times 1 \times (T - 20) + 50 \times 0.1 \times (T - 20)$

$10 (100 - T) = 195 (T - 20) + 5 (T - 20)$

$10 (100 - T) = 200 (T - 20)$

$210 T = 5000$

$T = 23.8$ °C

∴ The maximum temperature of water will be 23.8 °C.

(8) Ans. 1. Metals have these typical physical properties: Lustrous (shiny), Hard , High density (are heavy for their size) ,High tensile strength (resist being stretched), High melting and boiling points, Good conductors of heat and electricity and Sonority.

2. Non metals have Physical properties: Poor conductors of electricity and heat, Non-Ductile metals, Brittle solids, May be solids, liquids or gases at room temperature, not sonorous, Transparent.

Q.4 Answer the following:(Any One) 5

(1) Ans. a. Electric generator

b. Fleming's right hand rule

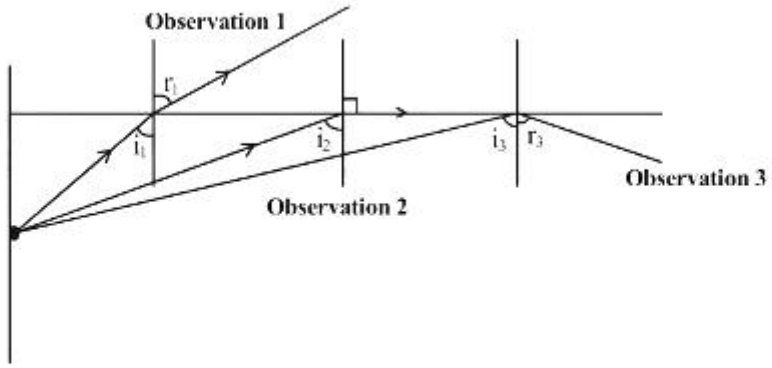
c. Generators do not create electricity instead it uses the mechanical energy supplied to it to force the movement of electric charges present in the wire of its windings through an external electric circuit. This flow of electrons constitutes the output electric current supplied by the generator.

d. To produce electric current

(2) Ans. i) The specific value of $\angle i$ called critical angle.

ii) Total internal reflection.

iii)



Observation 1 : When $i_1 < i_C$, then refraction takes place and refracted ray moves away from normal. $r_1 > i_1$

Observation 2 : When $i_1 = i_C$ then refracted ray becomes perpendicular to normal.

Observation 3 : When $i_3 > i_C$ then total internal reflection takes place. $\boxed{i_3 = r_3}$