

SECTION A [30 MARKS]
ANSWER ALL QUESTIONS

Question 1

[15]

- a) For each question, there are **FOUR** responses: **A, B, C, and D**. Choose the corresponding letter of your response and **CIRCLE** it neatly. **NO** score will be awarded if you circle more than **ONE** letter.
- i. Which cell organelle is comparable to library's catalog system?
- A The mitochondria as it gives the energy
 - B The ribosome as it synthesizes proteins
 - C Lysosome as it cleans and recycles materials
 - D The nucleus as it stores and reads genetic information
- ii. To understand the consequences of substance abuse, one should
- I. observe the behaviors of substance abusers.
 - II. educate yourself on the impacts of abusing substances.
 - III. consume different substances to understand the consequences.
- A I and II
 - B I and III
 - C II and III
 - D I, II and III
- iii. A forest serves habitat for diverse bird species that depend on the same variety of insects as the primary source of food. If a newly introduced bird species starts consuming large amounts of these insects resulting in starvation of old species. This situation can be described as
- A no competition between the species.
 - B interspecific competition between newly introduced birds.
 - C intraspecific competition between old and newly introduced birds.
 - D interspecific competition between old and newly introduced birds.
- iv. The student is provided with an element X, whose atomic number is 11 and a mass number is 23. What is the number of neutrons?
- A 34
 - B 23
 - C 12
 - D 11

v. The element potassium is placed in first group and fourth period in a periodic table, because

- A it has four shells and one valence electron.
- B it has three shells and one valence electron.
- C it has four shells and two valence electrons.
- D it has four shells and four valence electrons.

vi. Which of the following diagrams represents a compound?

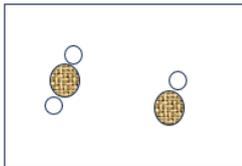


Figure A

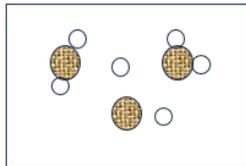


Figure B

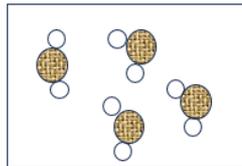


Figure C

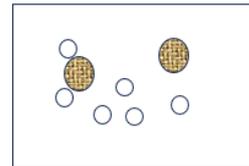
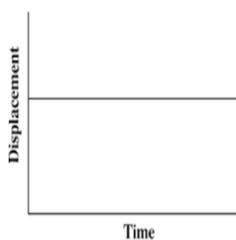


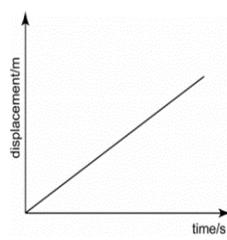
Figure D

- A Figure A
- B Figure B
- C Figure C
- D Figure D

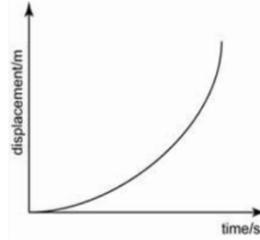
vii. The graphs shown below represents different displacement-time graph recorded while carrying out the experiment. Identify the graph that represents an object slowing down over a time.



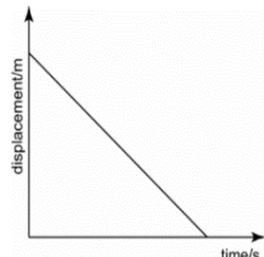
Graph I



Graph II



Graph III

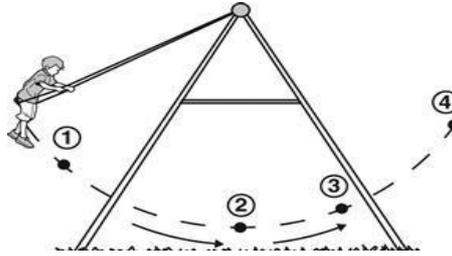


Graph IV

- A Graph I
- B Graph II
- C Graph III
- D Graph IV

viii. Based on the diagram, which position of the swing has the maximum amount of kinetic energy?

- A Position 1
- B Position 2
- C Position 3
- D Position 4



ix. During a routine check, you find a circuit in a machine that isn't working properly due to a resistance issue with the wire. You measure the circuit's voltage, which is 24 volts. You also measure the current, and it is 3 amperes. What is the required resistance?

- A 6 ohms
- B 8 ohms
- C 10 ohms
- D 12 ohms

x. The graphs given below represent sound waves recorded while experimenting with different sounds. Which of the following sound wave represents the lowest volume?



Graph I

Graph II

Graph III

Graph IV

- A Graph I
- B Graph II
- C Graph III
- D Graph IV

xi. What are the economic benefits that commercial plant growers have from vegetative propagation?

- A It promotes genetic diversity
- B It requires less equipment and expertise
- C It enables the rapid production of diverse plants
- D Propagation of desirable plants, increased yield in short duration

- xii. During the experiment, a student mixed magnesium with chlorine. As a result, the mixture produced magnesium chloride. Identify the type of reaction involved?
- A Synthesis
 - B Decomposition
 - C Single displacement
 - D Double displacement
- xiii. A lot of teens and young adults (12–35 years old) in middle- and high-income countries are exposed to unsafe sound levels when they use personal audio devices. Another 40% of them are exposed to sound levels that could be harmful at clubs, discos, and bars (WHO, 2015). What measures should be incorporated into day-to-day activities to avoid harmful effect of unsafe sounds?
- I. Manage volume levels in audio gadgets
 - II. Listening to high sound for prolonged duration
 - III. Educate yourself and others on impact on unsafe sounds
 - IV. Minimize the duration of using headphones or earphones
- A I, II and IV
 - B II, III and IV
 - C I, II and III
 - D I, III and IV
- xiv. An element has an atomic number of 17. What is the maximum number of electrons that can be accommodated in the M shell?
- A 1
 - B 7
 - C 8
 - D 2
- xv. Electromagnets used for segregating metals from non-metals in scrapyards were not efficient. What factors would you consider to enhance its effectiveness?
- I. Increased the current flow
 - II. By using permanent magnet
 - III. Increased number of turns in the coil
 - IV. By changing the polarity of the magnet
- A I and III
 - B II and IV
 - C I and II
 - D I and IV

b) Fill in the blanks with appropriate word(s).**[5]**

i.	For the planets orbiting around the Sun, the centripetal force is provided by its _____.
ii.	The pitch of the sound _____ if Dorji reduces the wavelength and increases the amplitude of his musical instrument.
iii.	When a paper is burned, the total mass of the _____ and the total mass of the product remains same.
iv.	Sonam accidentally poured a litter of saline water to a potted tomato plant. The plant was seen wilted after an hour. The cause of wilting is due to _____.
v.	The electronegativity of the elements _____ from group 1 to group 2 in the periodic table.

c) Write TRUE or FALSE for the following statements in the space provided in the 'Answer' column.**[5]**

	Statement	Answer
i.	Consumption of junk foods affects our bones only.	
ii.	Secondary consumers will have more toxic level than tertiary consumers in food web.	
iii.	The friction experienced by an object moving through the fluid is determined by its shape.	
iv.	The force of gravity between two objects depends only on distance.	
v.	Acid reacts with metal to give salt and hydrogen.	

- d) Match each item in column A with the most appropriate item in column B. Write the correct letter in the space provided in the 'Answer' column. [5]

Column A	Column B	Answer
i. Introduction of fish and crabs in paddy field.	a. Alternating current.	i.
ii. Melting of glaciers and rise in sea level.	b. Time	ii.
iii. Magnesium reacts with oxygen to form magnesium oxide in fixed proportions.	c. Endothermic reaction.	iii.
iv. The variable that is inversely proportional to power.	d. Compound	iv.
v. Household wiring uses.	e. Ecofriendly	v.
	f. Distance	
	g. Decomposition reaction	

SECTION B [50 MARKS]
ANSWER ALL QUESTIONS

Answer the following questions in the spaces provided. The marks for each question are given in the brackets [].

Question 2

- a) Read the following information that are compared with the cell organelles and identify the cell organelles.

- i. I am the maintenance staff and I play the role of breaking down and recycling waste. [1]

- ii. I am present in both plant and animal cells. I work as the generator and releases energy by breaking down foods. [1]

- b) Karma conducted an experiment on osmosis using a potato strip and provided a recorded data. Refer the data and answer the following question.

Set Up	Potato Strip		
	Initial Length	NaCl (w/v)	Final Length
A	5 cm	1%	4.5 cm
B	5 cm	5%	4 cm
C	5 cm	10%	3.5 cm

- i. Why do you think the size of the potato strip decreased? [1]

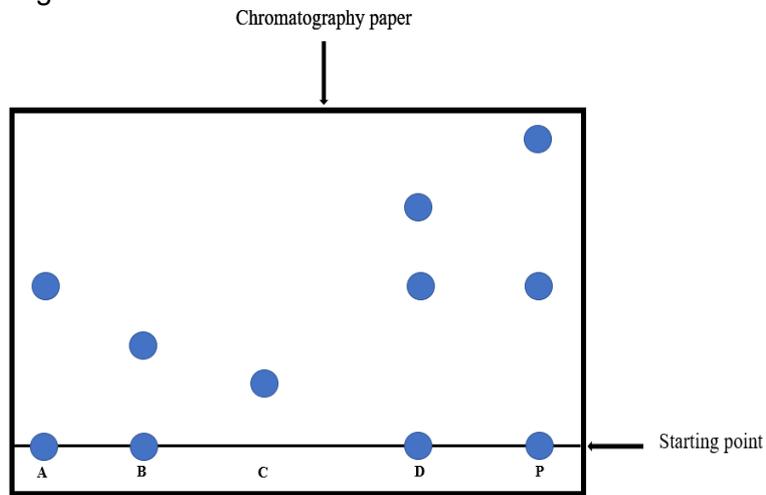
- ii. How can you increase the size of the potatoes' stripes? [1]

- c) Calcium has atomic number 20 and it loses its electrons when it reacts with other atoms. Draw the atomic structure of calcium ion? [2]

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- d) Chemical wastes and old batteries are harmful to the environment, therefore it is important to establish drop-off center and recycling units. Mention **ONE** benefit of this initiative. [1]

- e) The substances P is a mixture formed by mixing two different substances. When the mixture P is separated using chromatography, the following results as shown in the diagram are recorded. Identify two different substances present in the mixture P based on the figure given below? [1]



- f) Most of the house fire in the communities are caused due to electric short circuits. To address this issue in the community, suggest **TWO** electrical safety measures? [1]

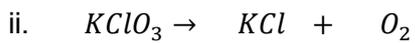
- g) The car appears black under the yellow street light. What is the actual colour of the car? [1]

Question 3

- a) Which tissue is responsible for the flexibility in plants? [1]

- b) Yaks in the high mountains are currently experiencing high temperature due to global warming. Mention **TWO** specific adaptive characteristics that should be changed for its survival? [2]

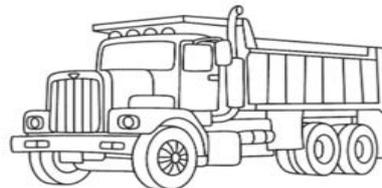
- c) Balance the following chemical equations. [2]



- d) The following figure shows two different trucks with same mass and power. Which truck can carry heavy loads? Give **ONE** reason. [2]



A



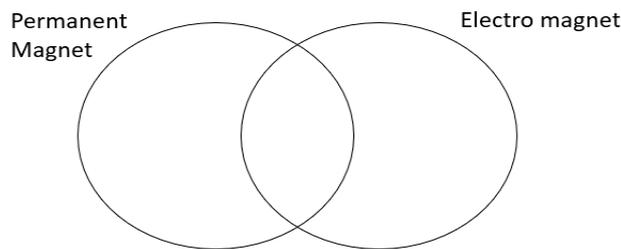
B

- e) An object with the mass of 16 kg is placed on the Earth, where acceleration due to gravity is 10 m/s^2 . Calculate the weight exerted by the object due to gravity. **[2]**

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- f) The following characteristics are exhibited either by permanent magnet or electromagnets.
- i. They are used in electrical appliances
 - ii. It requires electrical current
 - iii. It has fixed initial magnetic strength
 - iv. It has two poles
 - v. It loses magnetic property over time

Enter **TWO** similarities of permanent magnet and electro magnet in the intersection of the Venn diagram given below. [1]



Question 4

- a) A person was playing a football and he unexpectedly fell down due to muscle cramp. As a science student, how are you going to explain the cause of the muscle cramp to the person? [1]

- b) Write **TWO** measures to balance human needs and conservation of biodiversity. [1]

c) Write the chemical formula for the following compounds.

i. Aluminium sulphate

[1]

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ii. Calcium carbonate

[1]

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d) A runner uses 20 N force and power of 400 W while competing for a 100 m race. How long did he take to complete the race?

[2]

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e) Most children have access to unlimited screen time and it is important to encourage children to limit their screen time, regardless of its necessity. Do you agree or disagree? Support with **TWO** reasons.

[2]

f) What is natural source of light? State **ONE** importance of it. [2]

Question 5

a) What are the consequences of teenage pregnancy? [1]

b) Organic farming is better than inorganic farming. Justify with **TWO** reasons. [2]

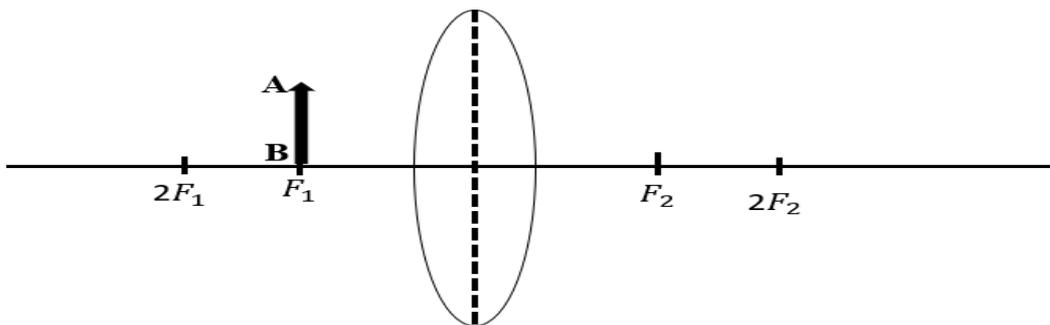
c) What are the causes of acid rain? State **TWO** prevention methods. [2]

- d) Filter A consists of 0.07 mm pores and filter B consists of 1 mm pores. Which filter is suitable for filtering muddy water? Give **ONE** reason. [2]

- e) Mention any **TWO** activities that can save energy at home? [1]

- f) Use the ray diagram given below to answer the following questions.

- i. Complete the ray diagram using two rays starting from tip of the object. [1]



- ii. Write **TWO** characteristics of image formed. [1]

Question 6

a) How do plant and animal breeding help increase food security?

[1]

b) Design an experiment to demonstrate exothermic reaction using sodium hydroxide and water. Mention the aim and procedures of the experiment.

[2]

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c) Consumption of alcohol leads to social problems like domestic violence and undermines family wellbeing. Suggest **ONE** approach to reduce domestic violence.

[1]

- f) The following table contains data of the speed of sounds in different medium. Study the data and answer the following questions.

Medium		Speed of the sound (m/s)
Solid	Aluminium	6420
	Nickel	6040
Liquid	Water	1531
	Ethanol	1207
Gas	Helium	965
	Oxygen	316

- i. Identify the independent variable from the experimental data. [1]

- ii. What can you conclude from the given data about the speed of the sound. [1]

