

## SECTION A (30 Marks)

### Question 1

[10]

**Direction: For each question, there are four alternatives: A, B, C and D. Choose the correct alternative and circle it. Do not circle more than ONE alternative. If there are more than one choice circled, NO score will be awarded.**

- i. A cell consists of organelles that perform various functions. Identify the cell organelle responsible for transferring hereditary traits.

A vacuole  
B nucleus  
C ribosome  
D mitochondria

- ii. The following statements are related to reproduction.

I. fertilization  
II. formation of blastula  
III. development of zygote  
IV. development of embryo

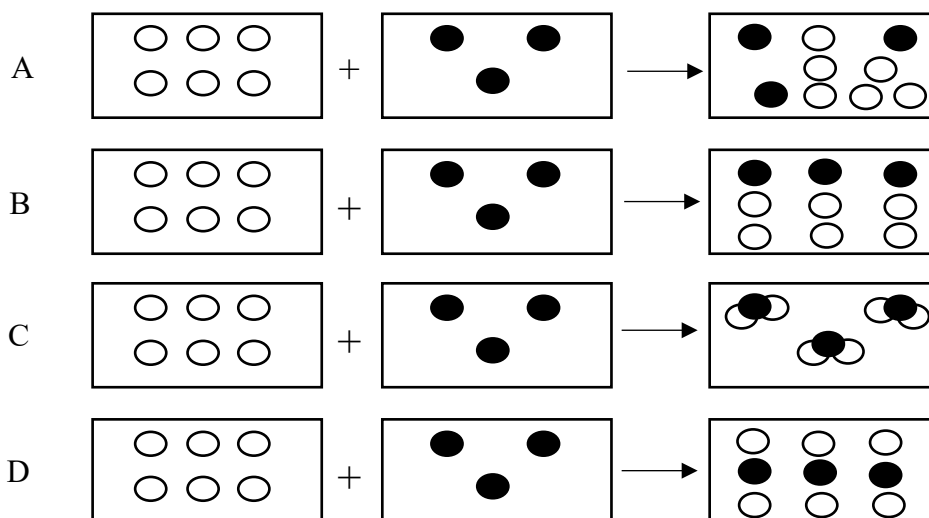
The correct sequence of foetal development is

A I, II, III, IV.  
B I, IV, II, III.  
C I, III, II, IV.  
D I, II, IV, III.

- iii. A part of the cactus breaks off, falls to the ground and begins to grow. The statement describes

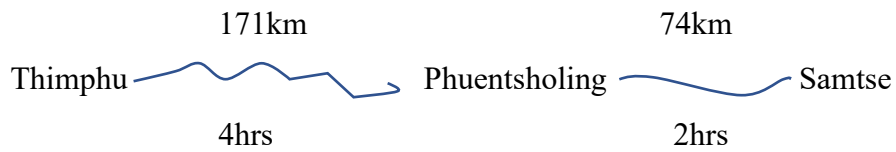
A germination.  
B natural propagation.  
C sexual reproduction.  
D artificial propagation.

- iv. Some pet dogs are trained by their owners. The ability to follow and understand instructions is termed as
- evolution.
  - natural selection.
  - structural adaptation.
  - behavioural adaptation.
- v. The following diagrams represent the mixing of atoms of different substances. Which diagram correctly models a chemical reaction?



- vi. The number of atoms of reactants and the number of atoms of products must be equal to fulfil the law of conservation of mass. Which chemical reaction obeys the law of conservation of mass?
- $\text{Mg} + \text{O}_2 \longrightarrow \text{MgO}$
  - $\text{H}_2 + \text{O}_2 \longrightarrow \text{H}_2\text{O}$
  - $2\text{Na} + \text{Cl}_2 \longrightarrow 2\text{NaCl}$
  - $\text{Zn} + \text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$

- vii. A car travelled from Thimphu to Phuntsholing and to Samtse as shown in the diagram below.



The average speed of the car from Thimphu to Samtse via Phuntsholing is

- A 37km/hr.  
B 40.8km/hr.  
C 42.7km/hr.  
D 61.2km/hr.
- viii. The amount of work done and time taken by four machines are listed in the table below. Which machine is the most powerful?

Machine	Work	Time
W	300J	10s
X	300J	20s
Y	400J	20s
Z	400J	10s

- A W  
B X  
C Y  
D Z
- ix. A device that breaks a circuit during the excess flow of current and can be reset is called
- A fuse.  
B MCB.  
C switch.  
D earthing.

- x. The water in the swimming pool appears shallower than it actually is. The phenomenon responsible for this is
- A refraction.
  - B reflection.
  - C dispersion.
  - D diffraction.

## Question 2

[7]

**Direction: Fill in the blanks with appropriate words.**

- i. Scientists have launched many artificial satellites that orbit the Earth. However, the \_\_\_\_\_ is the natural satellite of the Earth.
- ii. Knee joint can be compared to the opening and closing of a door. This is an example of \_\_\_\_\_ joint.
- iii. The organic method which can maintain soil moisture and control the growth of weeds is \_\_\_\_\_.
- iv. The increase in the concentration of toxic chemicals up the trophic levels is called bio-magnification. The \_\_\_\_\_ consumer has the lowest toxic level.
- v. Compound radical is a radical which contains atoms of more than one element. In  $\text{Na}_2\text{CO}_3$ , the positive radical is \_\_\_\_\_.
- vi. Surfaces that are rough has more \_\_\_\_\_ than surfaces that are slippery.
- vii. A referee uses a whistle to manage the game as the shrillness of the sound can be heard over a long distance. This quality of sound is determined by \_\_\_\_\_.

**Question 3****[6]**

**Direction: Match each item in column I against the most appropriate item in column II. Write the letter against the number in Column III.**

Column I		Column II	Column III
i	Reaction of an acid and metal produces	a gravity	i.
ii	Separation technique to detect drug compounds in urine	b inter-specific	ii.
iii	The element having same atomic number but different mass number	c hydrogen gas	iii.
iv	The force that varies with latitude and altitude	d radiation	iv.
v	The transfer of heat from a hot body to cold body without any medium	e chromatography	v.
vi	Competition between tiger and lion for food	f convection	vi.
		g intra-specific	
		h isotope	

**Question 4****[7]**

**Direction: Write TRUE or FALSE against each statement in the space provided.**

- i. Generally, women have voice of higher frequency than men.  
( )
- ii. Two or more pure substances chemically combine to form a mixture.  
( )
- iii. During digestion, energy is released instantly after eating food.  
( )
- iv. The speed of light is faster in the air than water. ( )
- v. The Earth depends on Sun for light because it is a non-luminous object.  
( )

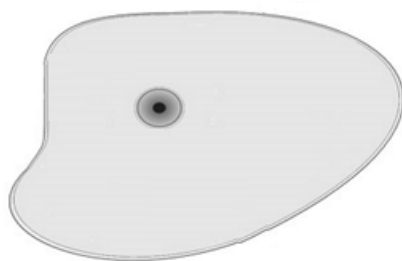
- vi.      Omicron virus is a multicellular organism. (\_\_\_\_\_)
- vii.     Dried grapes swell when placed in water. This is because of diffusion.  
(\_\_\_\_\_)

### Section B (50 Marks)

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

#### Question 5

- a.      A student mounted a permanent slide under a microscope and observed the following cell organelles.



- i. What evidence in the diagram proves that it is an animal cell? [1]


- ii. Compare the following cell organelles to a school. [1]

1. cell membrane		
2. nucleus		

- b. Substance abuse is the use of drugs and alcohol in amounts which are harmful to individual and others. State how substance abuse affects the mental, physical and social wellbeing of a person. [3]

Mental		
Physical		
Social		

- c. A rose plant can be generally propagated through stem cutting. However the propagation is not limited to one method. Suggest any other method that you think can be used to propagate rose plant. Draw pictures to show the method. [2]

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- d. How would a streamlined body of an object help to reduce fluid friction? **[1]**


- e. The reaction shown below is a physical change. Do you agree? Give **TWO** reasons to justify your claim. **[2]**




### Question 6

- a. Teenage pregnancy is considered as a social curse. Do you agree? Support with **TWO** reasons. **[2]**




- b. The table below shows the atomic number and mass number of five elements. Study the table and answer the following questions.

Element	Atomic number	Mass number
A	3	7
B	9	19
C	12	24
D	16	32
E	19	39

- i. Which element contains the highest number of neutrons?

[1]

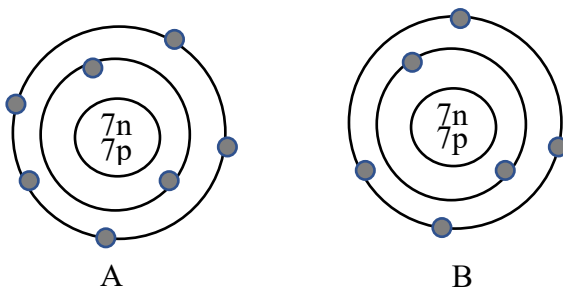

- ii. What would be the valency of element C?

[1]


- c. Design an experiment to purify muddy water using beaker, funnel and filter paper. [3]  
Label the filtrate and residue in the diagram.

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- d. Which one of the following atom is electrically neutral? Why? [2]



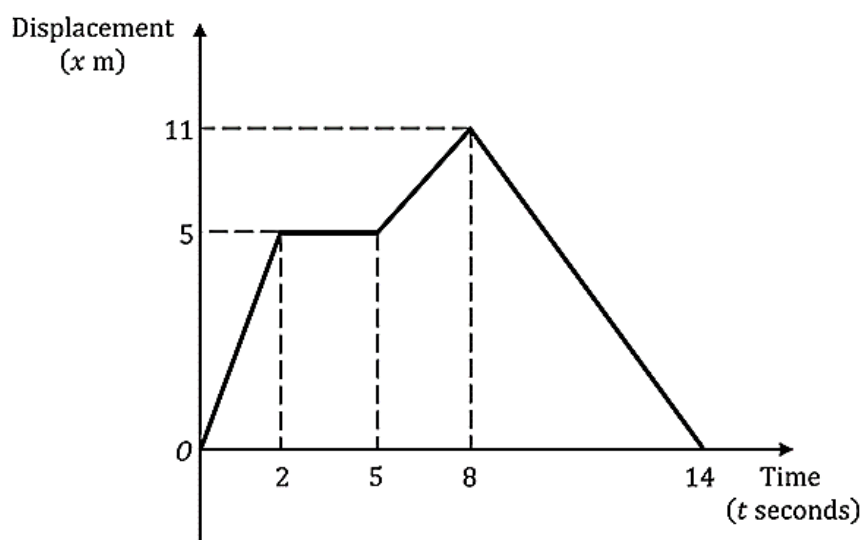

- e. A shirt appears yellow when red and green light is reflected. Name the primary colour absorbed by the yellow shirt. [1]


**Question 7**

- a. A student mixed two chemicals. The initial temperature of the reaction was 50°C and the final temperature was 70°C. What type of reaction is it? State **ONE** reason. [2]


- b. Students use different chemicals and apparatus to carry out experiments in the science laboratory. Frame **FOUR** safety rules to prevent hazards in the lab. [2]


c. Study the displacement-time graph of a runner given below.



i. Calculate the velocity of the runner during the first 2 seconds.

[1]

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ii. Describe the motion of the runner between 2 seconds and 5 seconds.

[1]

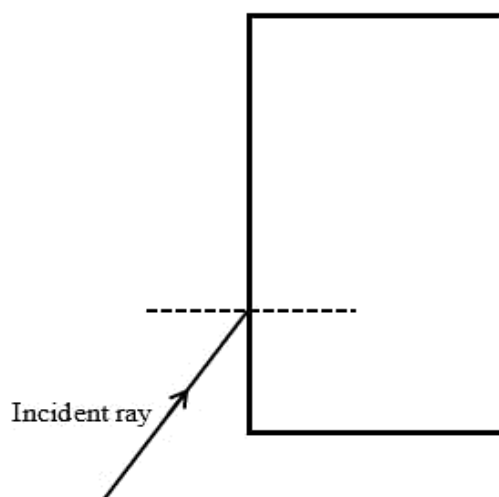

- d. Direct current (DC) is the current that flows only in one direction. Discuss **ONE** [2]  
advantage and disadvantage of DC.


- e. Acid rain is caused only by man-made activities. Do you agree? Provide **TWO** [2]  
justifications.


### Question 8

a. Complete the ray diagram given below and label the following: [2]

1. refracted ray
2. lateral displacement



b. 'Saving energy is saving money'. Mention **TWO** ways in which we can save energy at home. [2]


c. We see a lot of twinkling stars at night. However they are not visible during the day time. Why? [1]


- d. Calculate the electrical energy consumed and the cost for using different electrical appliances based on the data given below. [2]

Electrical appliance	Power Rating(W)	Duration of use	Electrical Energy (kWh)	Cost (Nu.) (1 unit=Nu.2)
Tube light	40	7 hrs	$40 \times 7/1000 = 0.28\text{kWh}$	_____
Rice cooker	1100	5hrs	_____	Nu.11

- e. Organic farming has more advantages than inorganic farming. Do you support this statement? Provide **TWO** reasons for your stand. [2]


- f. What is the difference between 2H and H<sub>2</sub>? [1]


### Question 9

- a. Developmental activities carried out in the community have a negative impact on biodiversity. Therefore, such activities should be stopped. Argue on this statement with **TWO** points. [2]


- b. Mention any **TWO** structural adaptations observed in aquatic animals. [1]


- c. Generally, our body has a pH range of 7.0 to 7.8. However, the change in pH leads to gastritis and tooth decay. State a remedy each to normalize the pH. [2]




- d. What would happen if the gravitational force of Earth were to become equal to that of the Moon? Mention **ONE** point in relation to the weight of an object. [1]


- e. Write the valency of the elements for the given compounds. [1]

Compounds	Valency
$\text{Fe}_2(\text{SO}_4)_3$	Fe: _____
$\text{MgCl}_2$	Mg: _____

- f. Dorji participated in a marathon. He covered a distance of 5km due north in 1 hour.

- i. Calculate the speed at which Dorji ran. [1]

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- ii. How long will he take to cover a distance of 500m due north, if he runs with the same speed? [1]

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- iii. How long will he take to cover 1500m to the west, if he runs with the velocity of 5m/s due west? [1]

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**For Rough Work**

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