

විශ්වාසීය පළාත් අධ්‍යාපන දෙපාර්තමේන්තුව - කොළඹ අධ්‍යාපන කලාපය மேல் மாநாணக கல்வித் திணைக்களம் - கொழும்பு கல்வி வலயம் Western Provincial Education Department - Colombo Educational Zone		
දෙවන වාර ඇගයීම - 2016 இரண்டாம் தரவாணமதிப்பு - 2016 Second Term Evaluation - 2016		
10 ශ්‍රේණිය தரம் 10 Grade 10	විද්‍යාව I விஞ்ஞானம் வினாத்தாள் - I Science Paper I	පැය එකයි இரண்டுமணித்தியாலாக One Hour

Note: (i) Answer all questions.

(ii) In each of the questions 1 to 40, pick one of the alternatives (1), (2), (3), (4) which you consider is correct or most appropriate.

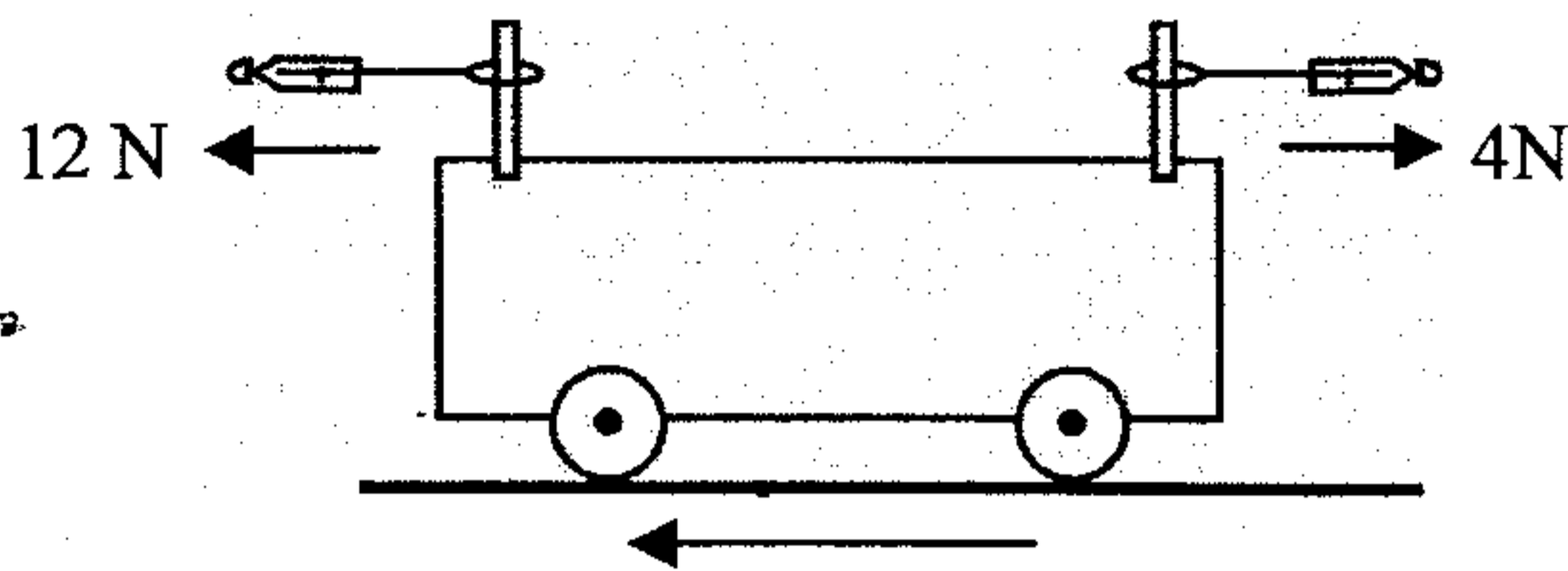
(iii) Mark a cross (x) on the number corresponding to your choice in the answer sheet provided.

- (1) Element that is needed for transmission of nerve impulses is,
 (1) K (2) Fe (3) I (4) N
- (2) Electronic configuration of ${}_{13}^{27}\text{Al}$ is,
 (1) 2, 8, 7 (2) 2, 8, 3 (3) 2, 8, 17 (4) 2, 8, 8, 9
- (3) S. I. unit of measuring displacement is,
 (1) ms^{-1} (2) ms^{-2} (3) m (4) m^{-1}s
- (4) An example for disaccharides is,
 (1) lactose (2) glucose (3) starch (4) galactose
- (5) Scientist who introduced the planetary model of the atom is,
 (1) Neils Bohr (2) Ernest Rutherford (3) J.J. Thompson (4) Dimithri Mendaleev
- (6) Mass of an object is 6 kg. Momentum of the object when it moves at a velocity of 50 ms^{-1} is,
 (1) 300 kg (2) $(50/6) \text{ ms}^{-1}/\text{kg}$ (3) $(6/50) \text{ kg}/\text{ms}^{-1}$ (4) 300 kgms^{-1}
- (7) Deficiency of which vitamin causes slow-down in blood clotting ?
 (1) C (2) D (3) K (4) E
- (8) Atomic number of a certain element is 17. Mass number of it is 37. That element is,
 (1) a mono - valent metal (2) a mono - valent non-metal
 (3) an inert gas (4) a bivalent element.
- (9) An object was projected upward with an initial velocity of 60 ms^{-1} . If the gravitational acceleration is 10 ms^{-2} time taken by it to reach the maximum height in seconds is,
 (1) 5 (2) 10 (3) 6 (4) 60
- (10) Network of flat or tubular sacs present within the cytoplasm of cells is,
 (1) ribosome (2) golgi complex (3) mitochondrium (4) endoplasmic reticulum

(11) How is it prevented the attraction of negatively charged electrons towards the positively charged nucleus?

- (1) as positive and negative charges repel each other
- (2) as electrons are attracted towards energy levels
- (3) as electrons rotate at a high speed around the nucleus
- (4) as there are neutrons in the nucleus which are neutral

(12) Following diagram illustrates the application of two forces on a trolley kept on a smooth surface. Resultant force applied on the trolley is,



- (1) 16 N (2) 8 N (3) 16 N (4) 8 N

(13) An aqueous solution of a saccharide was heated with few drops of dilute sulphuric acid and Benedict solution. Then a brick red precipitate was appeared. The saccharide present in solution is,

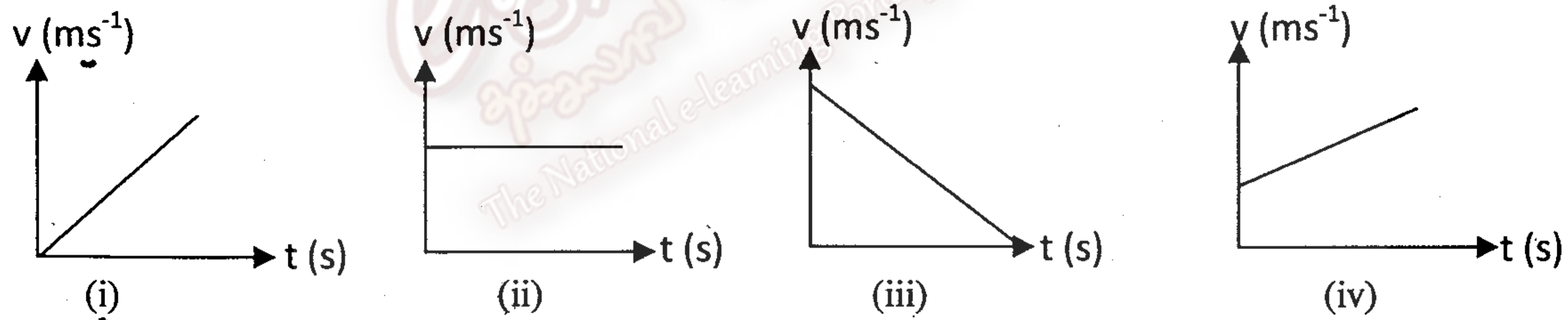
- (1) glucose (2) fructose (3) sucrose (4) galactose

(14) Molecular formula of glucose is $\text{C}_6\text{H}_{12}\text{O}_6$. What is the mass of a one mole of glucose molecules?

(C=12, O=16, H=1)

- (1) 180 g (2) 90 g (3) 270 g (4) 45 g

(15) Velocity – time graph showing the free-fall of a fruit from a tree is;



(16) The common carbohydrate present in animal liver and muscles is,

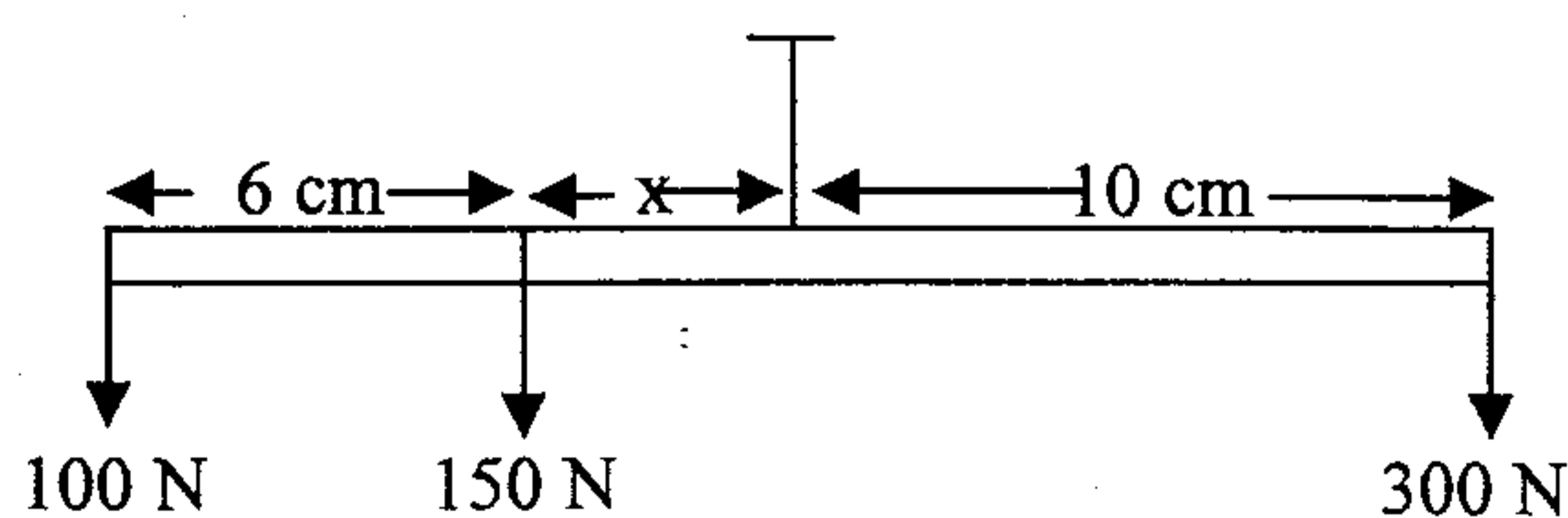
- (1) starch (2) glucose (3) glycogen (4) fructose

(17) Correct statement / statements regarding the valency shell of an atom is/are,

- a – they are shells with electrons
- b – it is the last shell with electrons
- c – it is the last shell with electrons that participate in bonding

- (1) a and b only (2) b and c only (3) only b (4) only c

(18)



If the above light rod is at equilibrium, length of 'X' is,

- (1) 10 cm (2) 12 cm (3) 9.6 cm (4) 3.2 cm

(19) This is not an example for under-ground stems,

- (1) ginger (2) onion (3) potato (4) manioc

(20) Chemical formula of sulphate of element A is ASO_4 . Chemical formula of its nitrate is,

- (1) ANO_3 (2) A_2NO_3 (3) $A_2(NO_3)_2$ (4) $A(NO_3)_2$

(21) Which one of the following is not an application of Newton's third law?

- (1) rowing a boat (2) motion of a helicopter
(3) motion of a hydrogen balloon (4) motion of an air cracker

(22) An example for fungus is,

- (1) yeast (2) paramecium (3) chlamydomonas (4) ulva

(23) This is not an application of the nitrogen gas,

- (1) to prepare ammonia (2) to fill filamentous bulbs
(3) to fill food packets (4) to make pharmaceutical drugs

(24) Mass of an object is 2 kg. An unbalanced force (F) applied on it increases the velocity from 10 ms^{-1} to 20 ms^{-1} in 5 seconds. The value of F is,

- (1) 2 N (2) 4 N (3) 20 N (4) 0 N

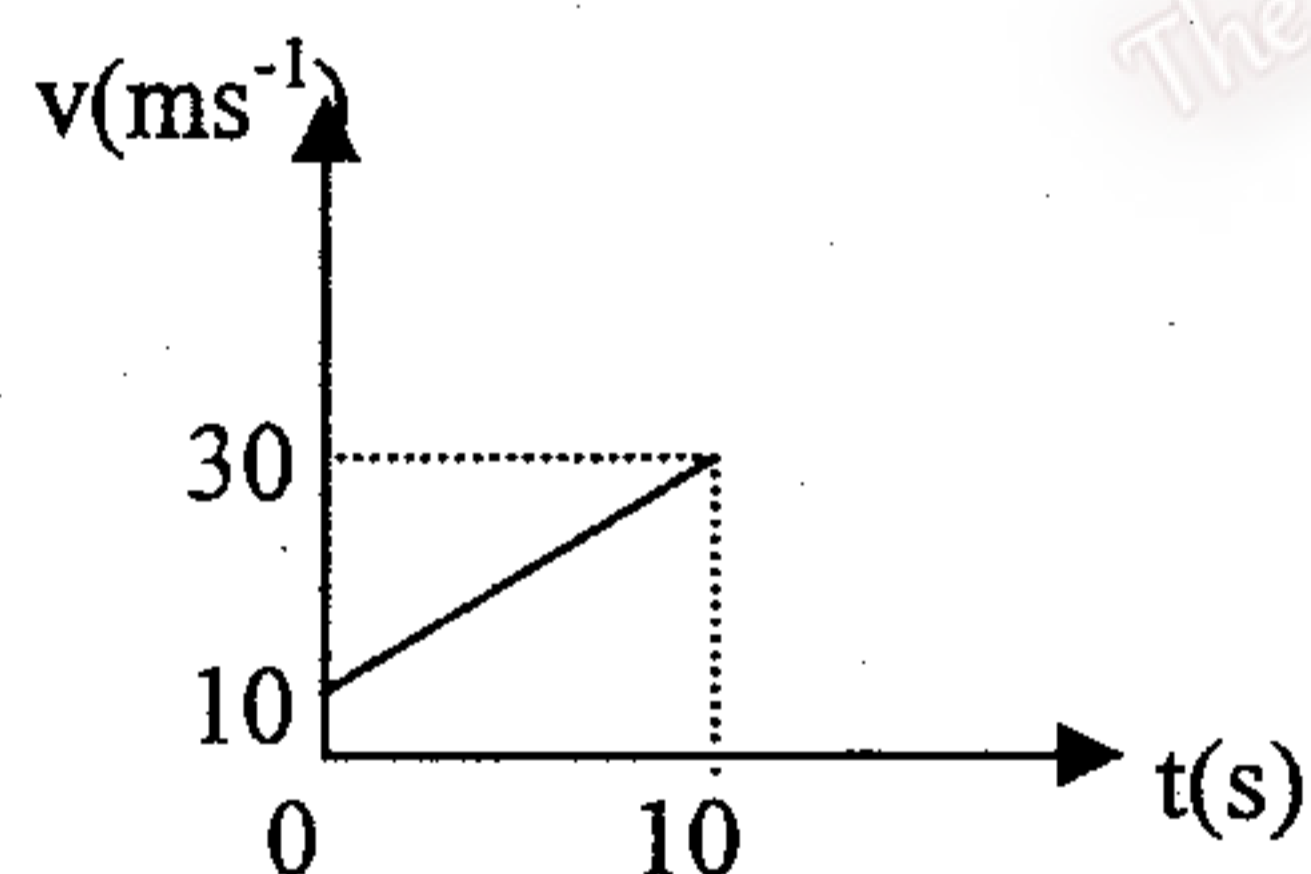
(25) Which of the following answers show the combination pattern of nitrogenous bases in nucleotides which are building units of nucleic acid?

- (1) A and C (2) T and C (3) T and G (4) A and T

(26) Substance that conducts electricity is,

- (1) crystals of common salt (2) aqueous copper sulphate solution
(3) distilled water (4) aqueous sugar solution

(27)



Velocity-time graph of an object is given. Displacement of that object is,

- (1) 100 m (2) 150 m
(3) 200 m (4) 300 m

(28) A certain somatic cell contains 10 pair of chromosomes. Number of chromosome pairs in daughter cells when that cell undergoes meiosis and mitosis respectively are,

- (1) 10, 10 (2) 10, 5 (3) 5, 10 (4) 10, 20

(29) When an ion is formed from a neutral atom,

- (1) number of electrons in the atom change (2) number of protons in the atom change
(3) number of neutrons in the atom change (4) number of protons and electrons in the atom change

(30) This is not an example for the moment of a couple of forces,

- (1) steering wheel (2) water pump (3) key (4) scissor

(31) Group of animals which are homeothermic are,

- (1) reptiles and birds (2) birds and mammals (3) amphibians and fish (4) reptiles and mammals

(32) Set of elements with the low electro-negativity is,

- (1) O, N, K (2) Mg, Ca, F (3) Cl, K, B (4) K, Ca, Na

(33) Static frictional force is defined as,

- (1) maximum frictional force applied on an object
(2) frictional force applied on a moving object
(3) frictional force applied on an object at rest, yet external force is applied.
(4) frictional force applied on an object when no forces are applied on it

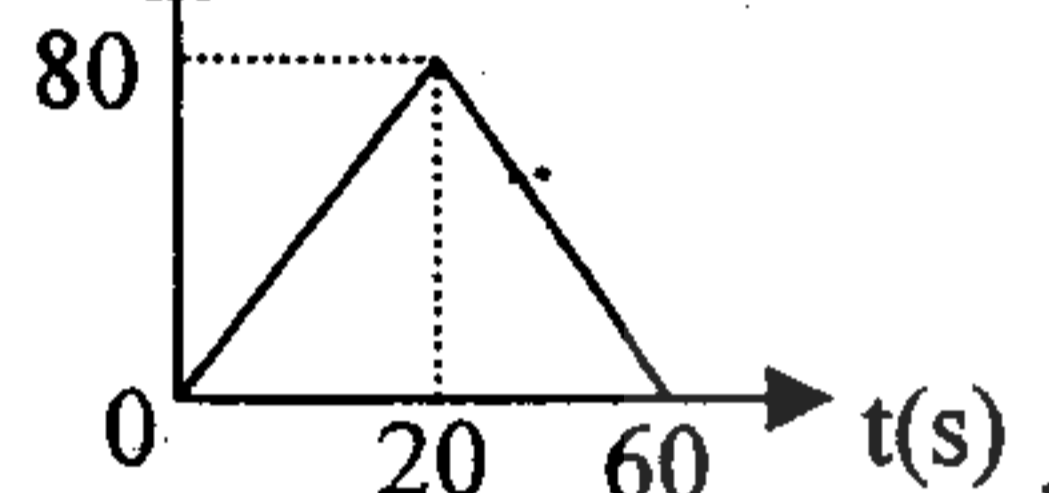
(34) Which of the following is **not** a function of plasma membrane?

- (1) acts as a cover for the cell (2) allows water and some other ions to enter the cell
(3) performs many metabolic activities (4) controls the removal of substances from the cell

(35) Number of molecules in 2 moles of carbon dioxide is,

- (1) 6.022×10^{23} (2) $2 \times 6.022 \times 10^{23}$ (3) 6.022×10^{24} (4) 3.011×10^{23}

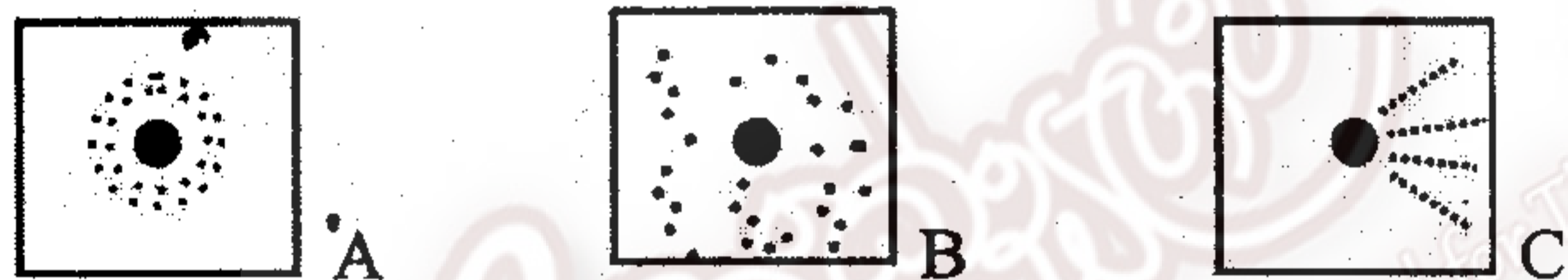
(36) $v(\text{ms}^{-1})$ Deceleration of the object given in the graph is,



- (1) -2 ms^{-2} (2) 4 ms^{-2}
(3) 2 ms^{-2} (4) $4/3 \text{ ms}^{-2}$

(37) Following diagram illustrate the fruit and seed dispersals of A, B and C plants.

(small dots represent the fruits and seeds)



According to the above diagrams their mechanisms of fruit and seed dispersal respectively are,

- (1) by animals, explosive mechanism, wind (2) by explosive mechanism, animals, wind
(3) by wind, animals, explosive mechanism (4) by animals, wind, explosive mechanism

(38) Correct statement regarding the covalent compounds is,

- (1) always they exist as solids (2) always they have low melting and boiling point
(3) certain covalent compounds dissolve in water (4) they consist of oppositely charged ions

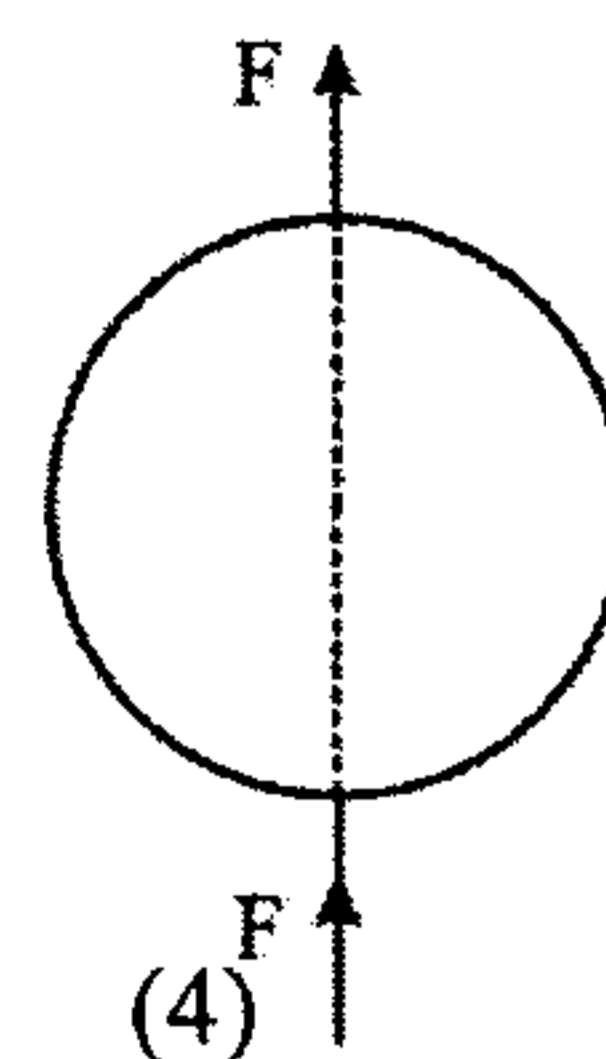
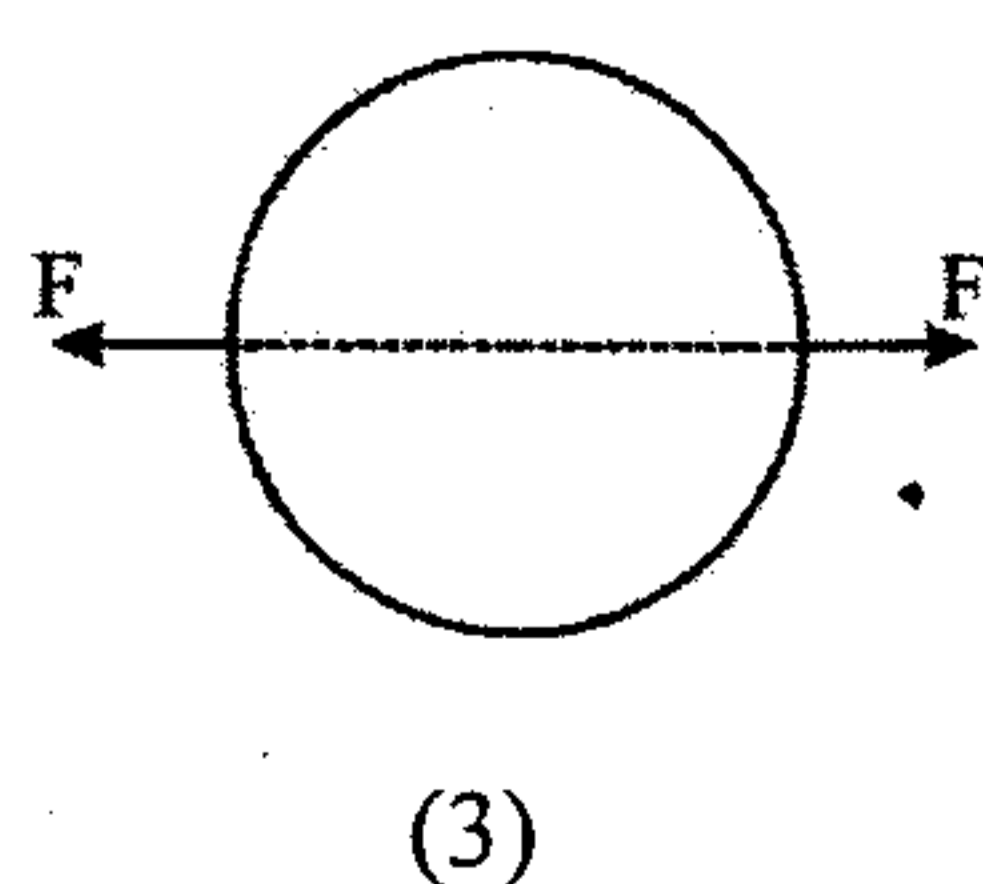
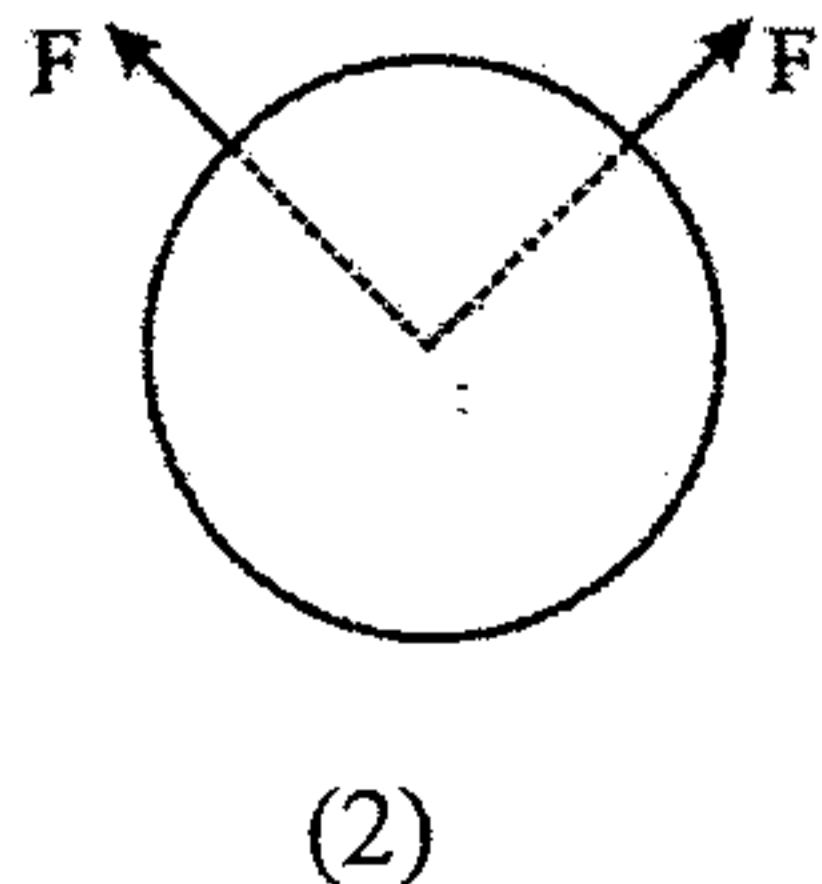
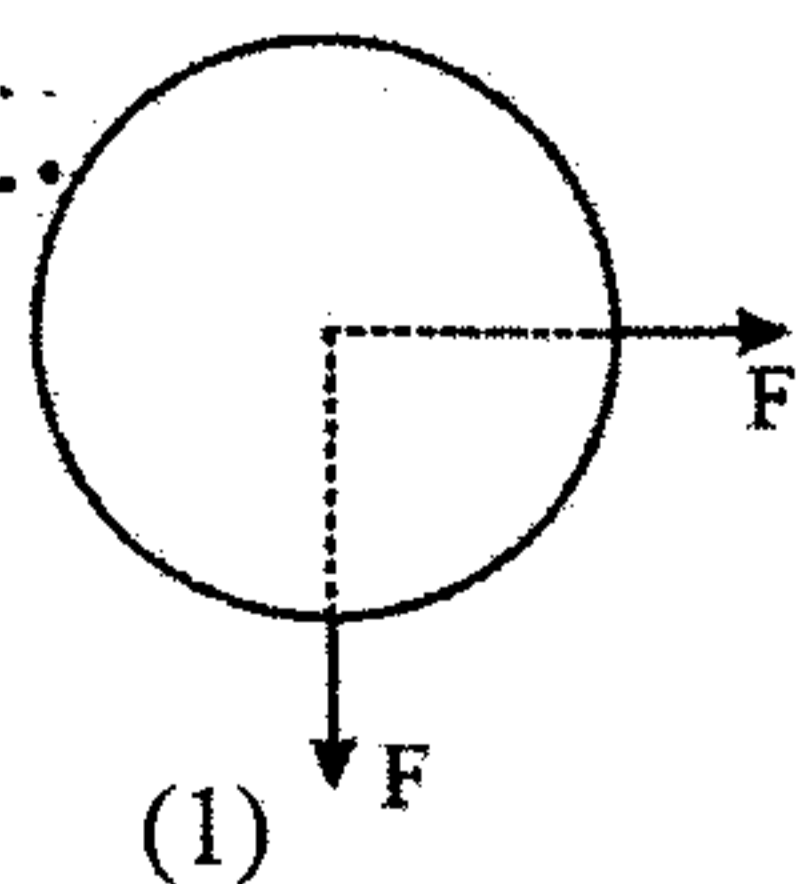
(39) Some statements regarding cross-pollination are given below,

- a – it helps to form new variations among the plants
b – it does **not** support for the evolution process
c – it is a step in the sexual reproduction of plants

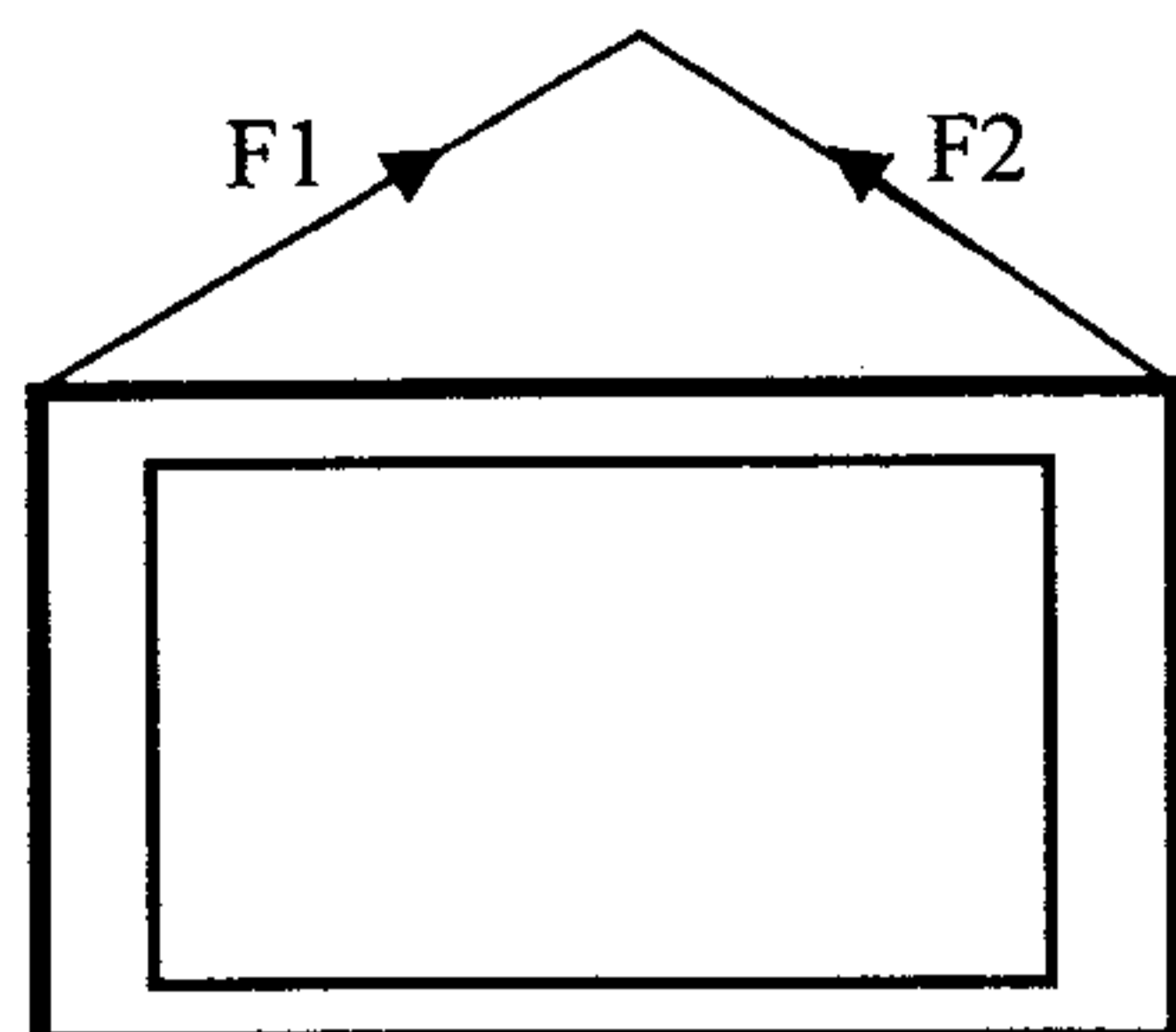
Correct statement/statements out of the above are,

- (1) a and b only (2) b and c only (3) a and c only (4) a, b, c all

(40) An equilibrium is represented by a set of forces on an object is,



(iii) A periodic chart was hung in the laboratory as in the following manner.



(a) Forces applied by the ropes are marked as F_1 and F_2 . What are these F_1 and F_2 forces on the rope?

.....
 (01 mark)

(b) Mark another force applied on the chart in the diagram, in addition to the forces marked in it.

.....
 (01 mark)

(c) Write two conditions of these 3 forces to be at equilibrium.

.....

 (02 marks)

(2) (A) Living organisms are different from non-living things due to living characteristics

(i) Write 02 features shown only by living organisms .

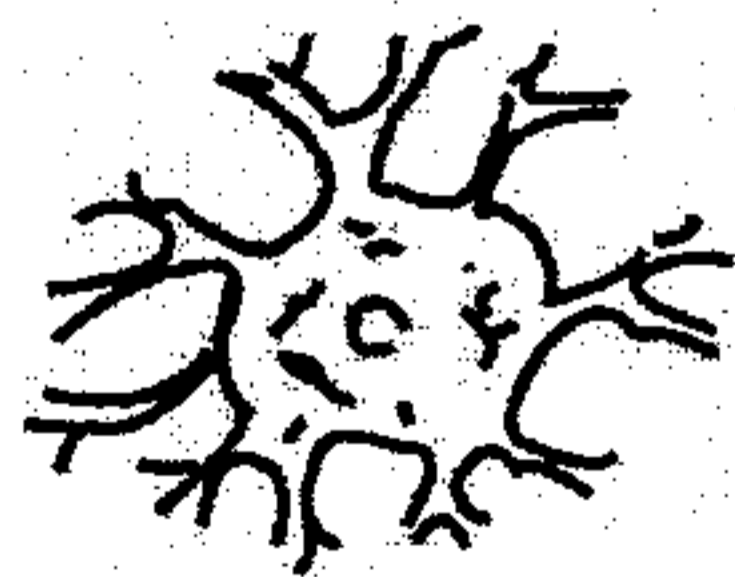
.....
 (2 marks)

(ii) Draw sketches to show two unicellular organisms that are seen under the microscope when observing a drop of pond water.

.....

 (02 marks)

(iii) Some human cells are shown below. Name these.



..... (02 marks)

(iv) Write what is meant by cell?

..... (01 mark)

(v) What is meant by tissue?

..... (01 mark)

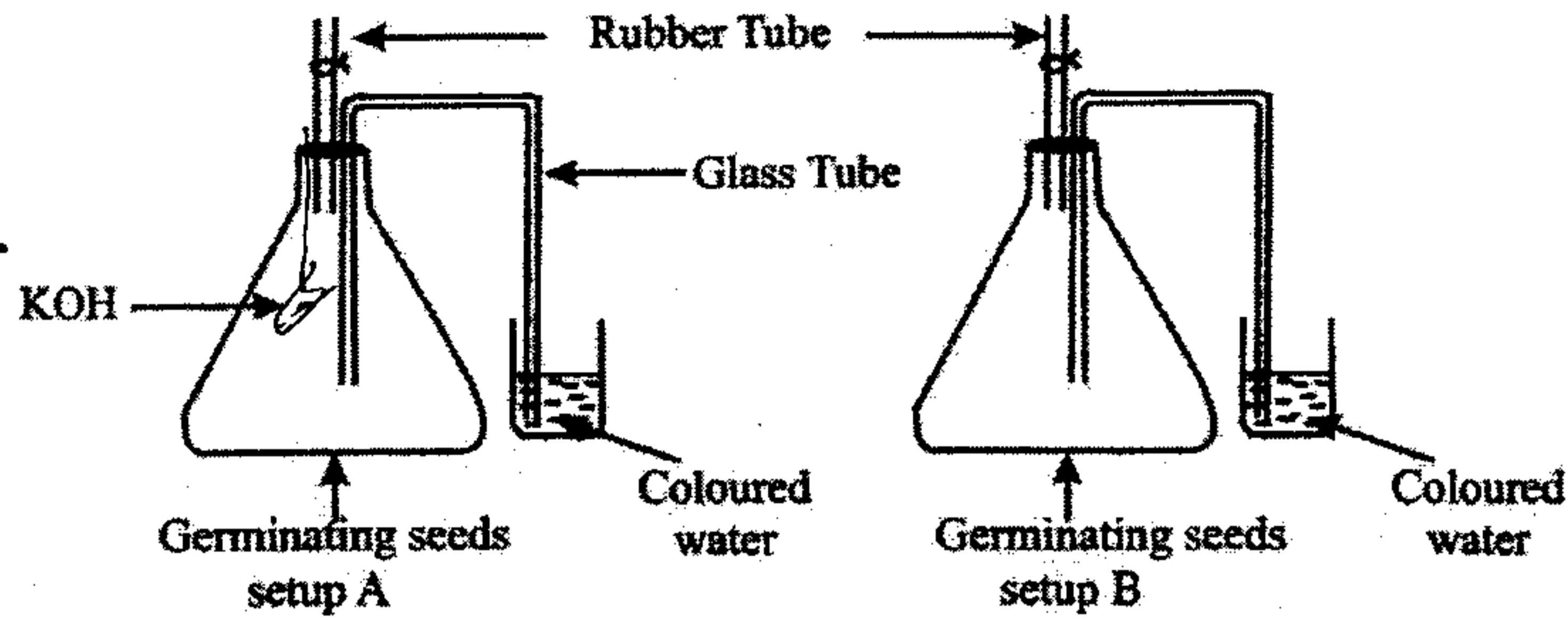
(B) (i) What is meant by cellular respiration?

..... (01 mark)

(ii) What gas is emitted in cellular respiration?

..... (01 mark)

(iii) This set up is used to show experiment that oxygen is used in respiration.



(a) Write how a sample of germinating seeds can be prepared for this experiment.

.....

(1 mark)

(b) What is the function of KOH in A

.....

(01 mark)

(c) What is the benefit of colouring the water

.....

(01 mark)

(d) Why does the water level in glass tube rise?

.....

(01 mark)

(e) What observation is expected from B?

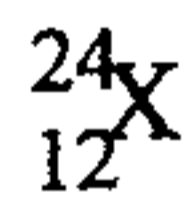
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(01 mark)

(3) (A) Fill in the blanks in the following paragraph using the suitable words.

The structural unit of matters is It consists of sub atomic particles such as protons, and Protons are charged and the are negatively charged Rutherford has introduced the model. According to it, electrons rotate around the positively charged This model was further studied by and explained that electrons rotate in energy levels. (04 marks)

(B) Symbol of an element was given as in the following manner.



(i) Of the above element, write down the,

- (a) atomic number
- (b) mass number
- (c) number of protons
- (d) number of neutrons
- (e) number electrons
- (f) electronic configuration

(06 marks)

(ii) Identify and name the element given as X

(01 mark)

(iii) Write down one of its physical property and one application.

.....

(01 mark)

(iv) Isotopes are the atoms of the same element with different mass numbers. What sub-atomic particle is present in different numbers in isotopes?

(01 mark)

(v) Write down the two isotopes of chlorine.

.....

(01 mark)

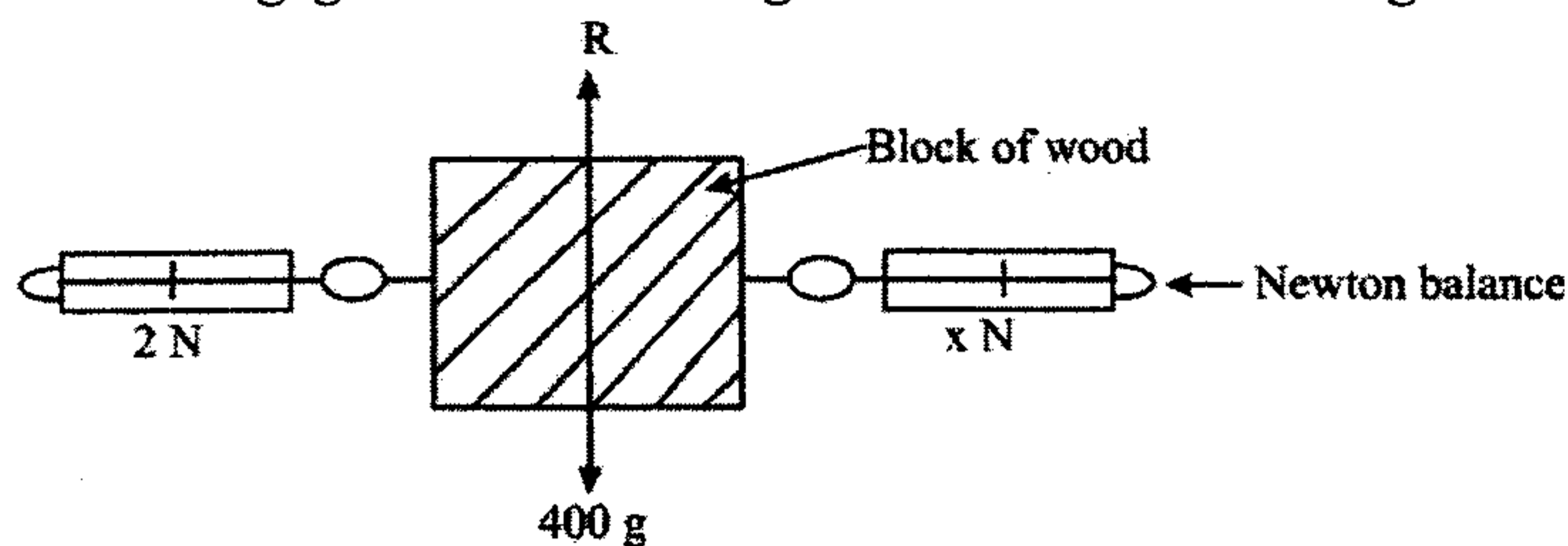
(vi) Out of the above isotopes of chlorine, what isotope has the highest natural abundance?

.....

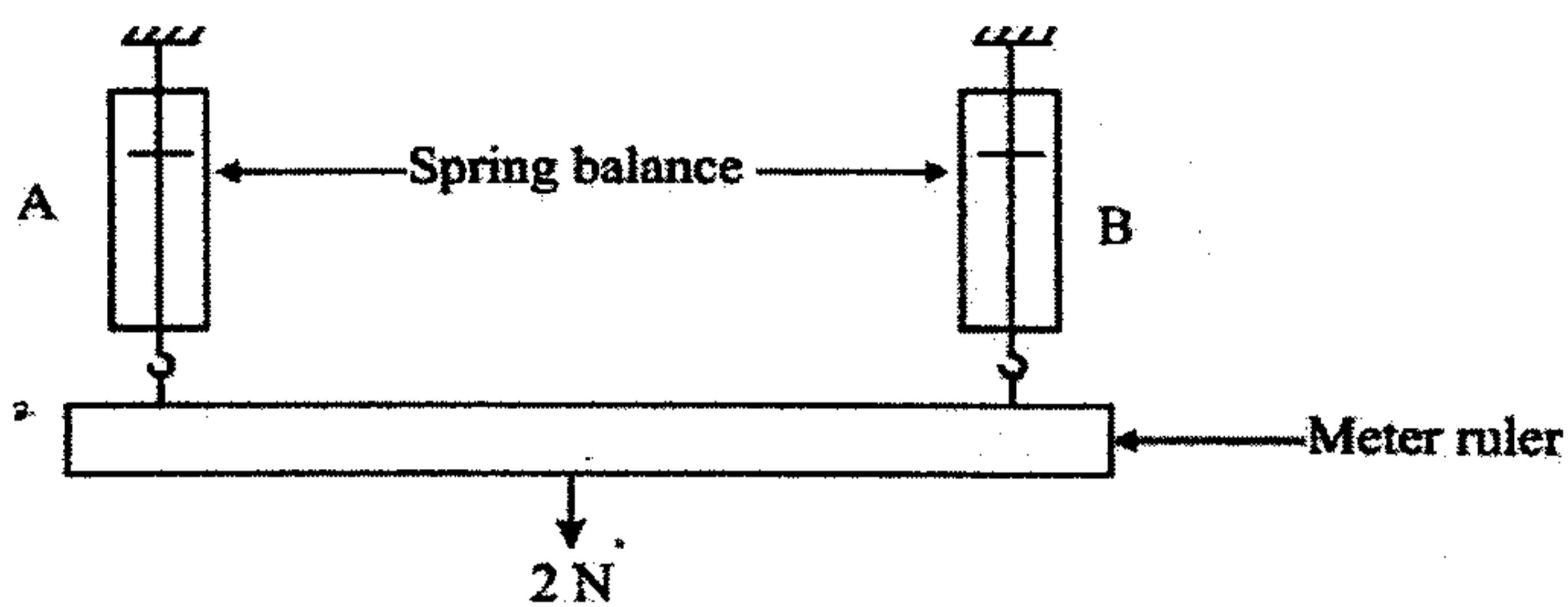
(01 mark)

(4) Two groups of students engaged in the following two activities to investigate about the equilibrium of forces.

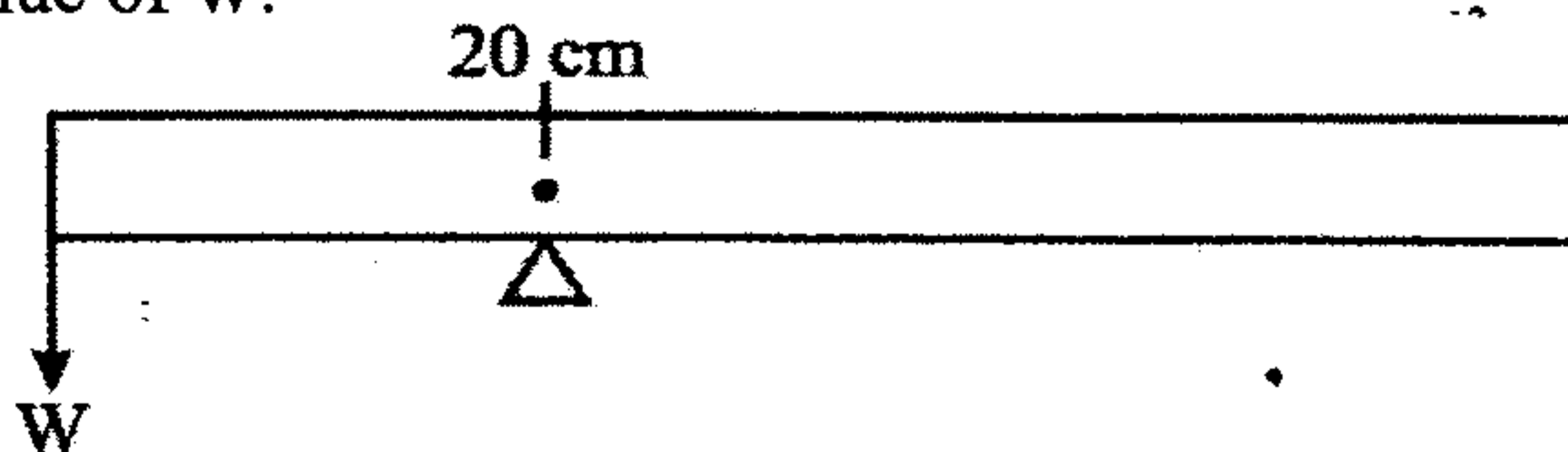
Activity 1



Activity 2



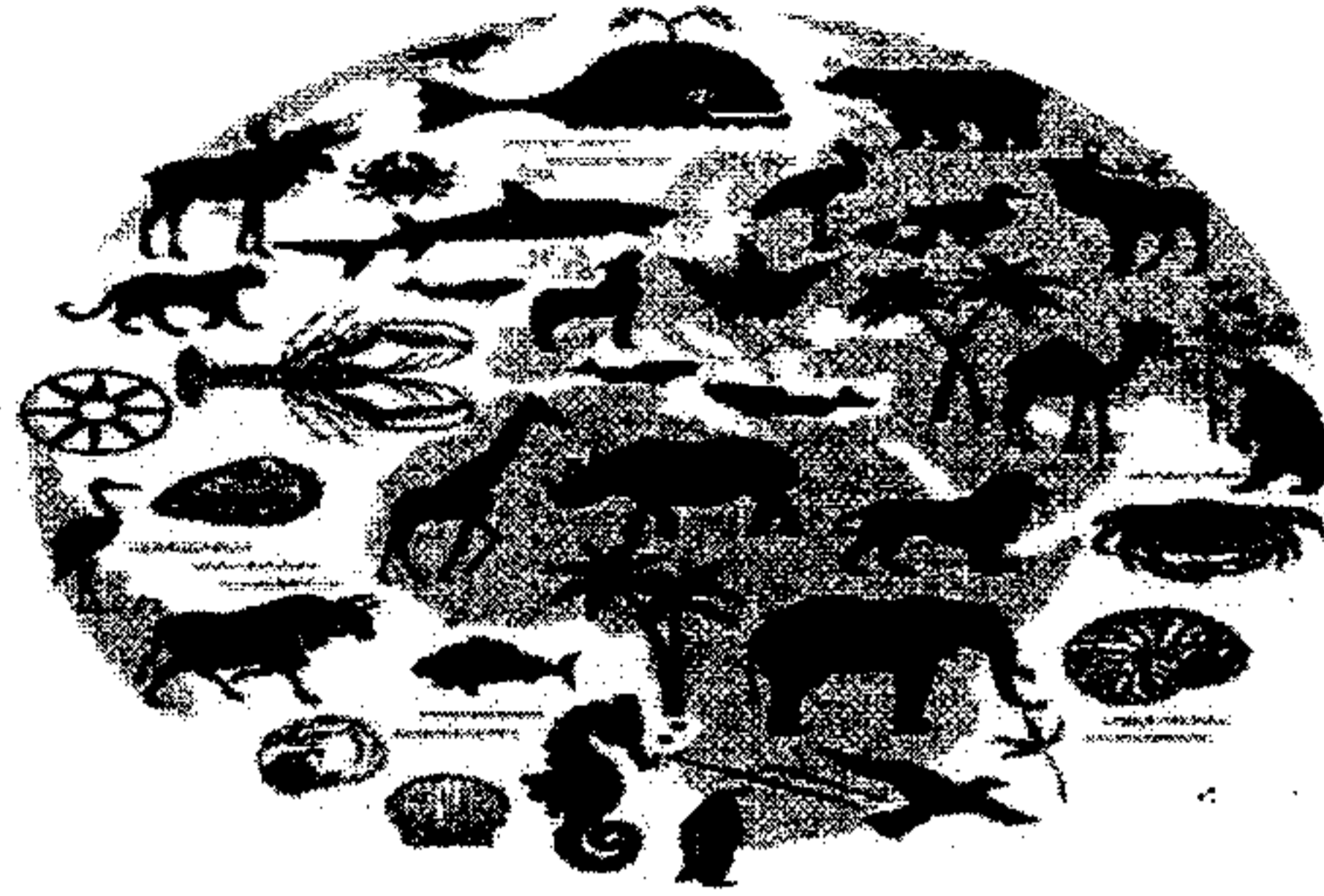
- (i) In the activity 1,
- (a) What is the weight of the block of wood?
 (01 mark)
- (b) What is the value of normal reaction (R)?
 (01 mark)
- (c) If the object is at rest, what is the value of X?
 (01 mark)
- (d) Write one condition needed to move the above object towards the direction of X force.
 (01 mark)
- (ii) In the activity 1, 4 N force was applied on the object yet it is about to move.
- (a) What is the resultant force?
 (01 mark)
- (b) What is the limiting frictional force?
 (01 mark)
- (c) Write two non-variable forces applied on the object though the object moves.
 (02 marks)
- (iii) In the activity 2,
- (a) What is the mass of the meter ruler?
 (01 mark)
- (b) What are the reading in A and B?
 A B (02 marks)
- (c) Write two instances in the environment where forces applied in the similar manner
 (02 marks)
- (iv) Following diagram illustrates the way a student applied a force to balance the meter ruler on 20 cm value. Calculate the value of W.



.....
 (02 marks)

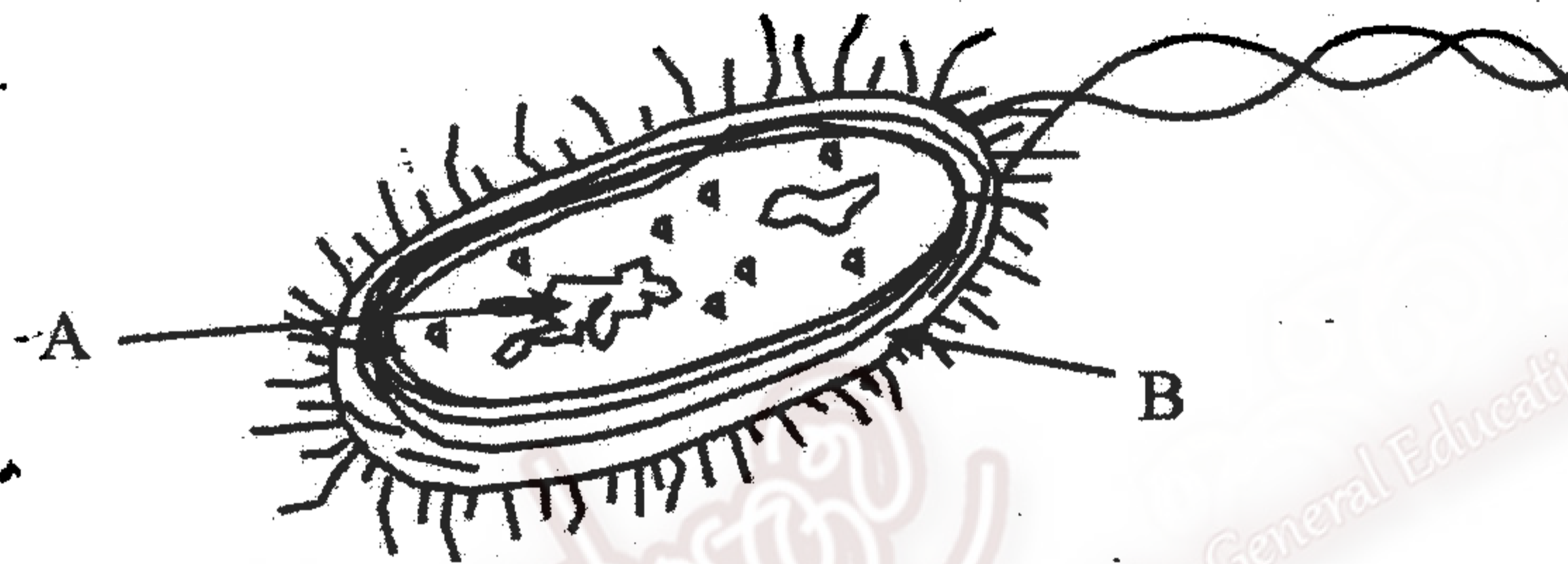
Part B – Essay

- (5) (A) Follow diagram illustrates the diversity of organisms in the biosphere. Man tries to interpret the biosphere through the concepts such as biodiversity, classification and nomenclature.



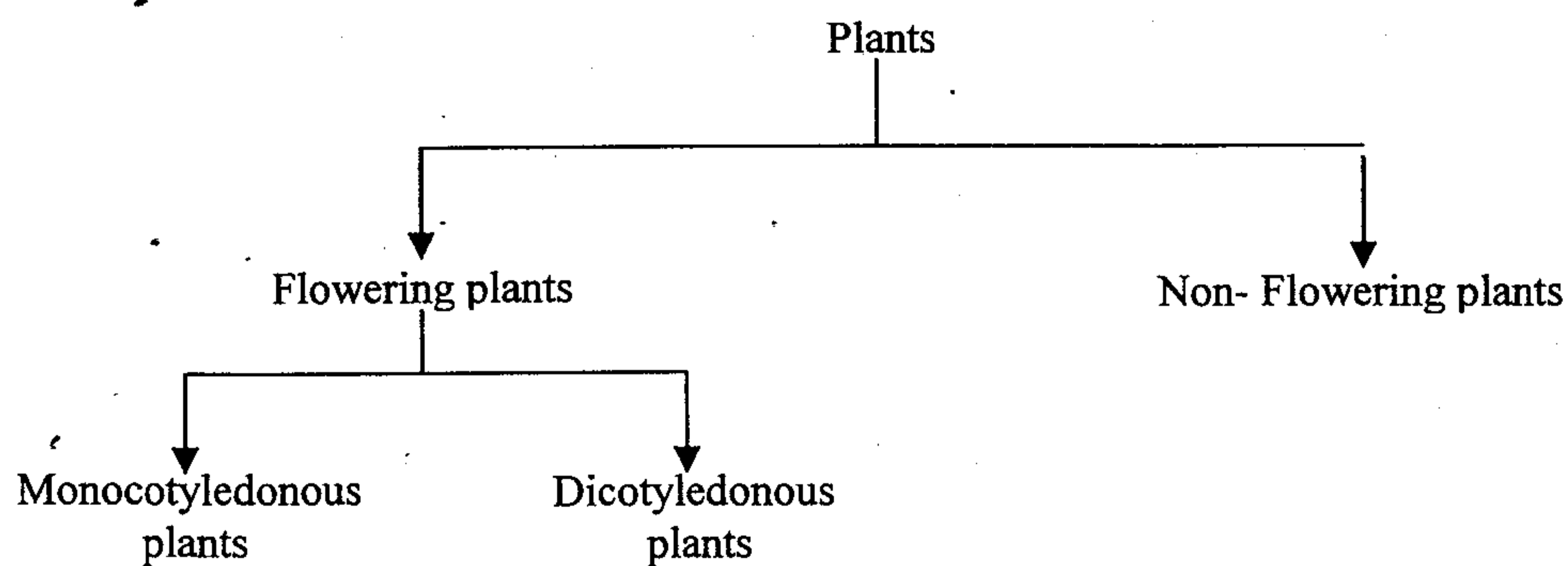
- (i) What do you mean by “bio diversity”? (01 mark)
- (ii) What do you mean by “classification of organisms”? (01 mark)
- (iii) Mention the two methods of classification of living organism. (02 marks)
- (iv) Write two advantages of classification of living organisms. (02 marks)

- (B) Following diagram shows a bacterial cell when seen under the electron microscope.



- (i) Name A, and B, (02 marks)
- (ii) Name two groups of organisms that belong to kingdom – protista (02 marks)
- (iii) Write two differences between algae and fungi. (02 marks)
- (iv) How do you call the mutual relationship between an alga and a fungus? (01 mark)

- (C) Following chart illustrates a part of the plant classification.



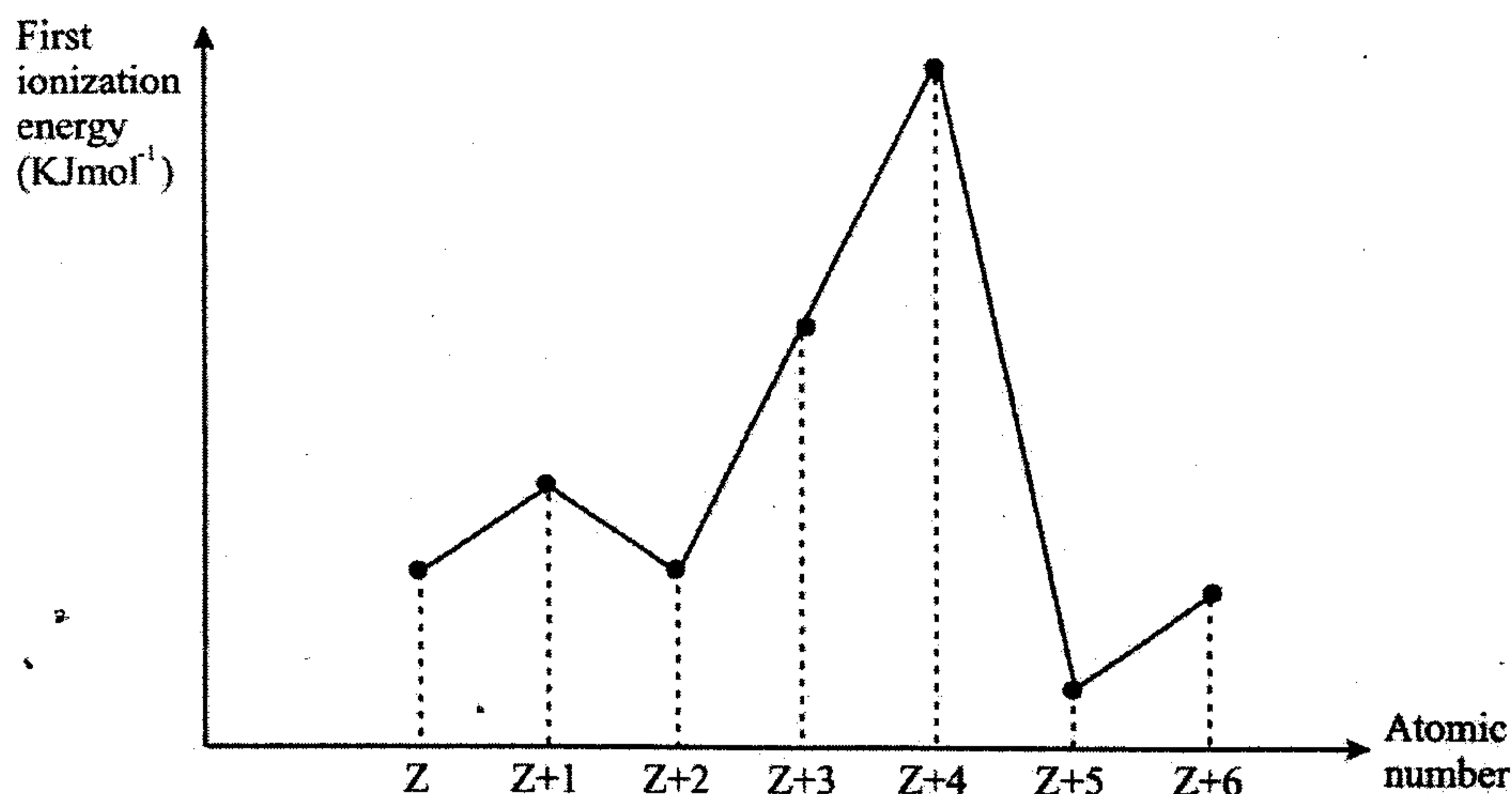
- (i) Write two non-flowering plants that do **not** produce seeds. (02 marks)
- (ii) Write two differences between monocotyledonous and dicotyledonous plants (02 marks)
- (iii) Name a non-flowering plant that produce seeds. (01 mark)

- (D) (i) Write two characteristics of coelenterates which are inheritance to them (01 mark)
- (ii) Write down the following name according to the standards of the binomial nomenclature.

PUNTIUS ASOKA

(01 mark)

- (6) (A) Following is a part of a graph showing the change in first ionization energy of consecutive elements in the second (2nd) and the third (3rd) period of the periodic table. Their atomic numbers are Z, Z+1, Z+2, Z+3, Z+4, Z+5 and Z+6.



- (i) According to the above graph identify and name the element with the highest first ionization energy. (01 mark)
- (ii) Identify the other elements and write down their chemical symbols. (Standard symbols) (02 marks)
- (iii) When go down in a group of elements ionization energy decreases. What is the reason for this? (02 marks)
- (iv) Copy the given structure of hydrogen fluoride molecule into your answer script. Mark the polarization of it. (02 marks)
- H ——— F
- (v) A H – F molecule polarizes but a H – H molecule does not polarize. What is the reason for this? (02 marks)
- (vi) Mention one specific property of water due to the inter-molecular attractions present in water. (01 mark)
- (B) (i) What is the Standard International unit of measuring amount of substance? (01 mark)
- (ii) Mass of an “A” atom is 3.34×10^{-23} g. Value of atomic mass unit is 1.67×10^{-24} g. Calculate the relative atomic mass of A. (02 marks)
- (iii) What is the number of molecules in 36 g of water? (01 mark)
- (iv) What is the number of moles of H atoms in 1 mole of water? (02 marks)
- (v) Copy and fill in the blanks in the table

	Compound	Relative molecular mass	Molar mass	Mass to be measured	by grams
a)	N ₂	28	.....	4 moles of atoms	.....
b)	CO ₂	.....	.....	3 moles of molecules	132 g
c)	CaCO ₃	.....	100 gmol ⁻¹	1.5 moles of molecules	.....
d)	COC(NH ₂) ₂	60	.....	0.5 moles of molecules	.....

(H = 1, C=12, O=16, N=14, Ca = 40)

($\frac{1}{2} \times 8 = 04$ marks)

- (7) A child threw a ball upward with a mass of 250g by a velocity of 40 ms^{-1} . ($g = 10 \text{ ms}^{-2}$)

- (i) (a) Define the term “velocity” (01 mark)
- (b) What is the initial velocity of the ball? (01 mark)
- (ii) When the ball reaches to the maximum height,
- (a) What is the velocity of it? (01 mark)
- (b) What is the time taken for it? (02 marks)
- (iii) When the ball moves upward,
- (a) What is the initial momentum? (01 mark)
- (b) Find the change in the momentum (01 mark)

- (iv) Draw the velocity-time for the throw of the ball until it reaches to the maximum height. (03 marks)
- (vi) When the balls reaches to the initial point,
 - (a) Calculate the total distance (02 marks)
 - (b) What is the total displacement? (01 mark)
- (vii) when the ball moves upward,
 - (a) What is the value of acceleration? (01 mark)
 - (b) What is the value of deceleration? (01 mark)
- (viii) Calculate the unbalanced force applied on the ball when it falls downward. (02 marks)
- (ix) Mark the forces on the ball when it has travelled a distance of "X" upward. (01 mark)
($x < \text{maximum height}$)
- (x) When the ball falls on the ground it bounces up. Explain this incident according to the laws of motion. (02 marks)

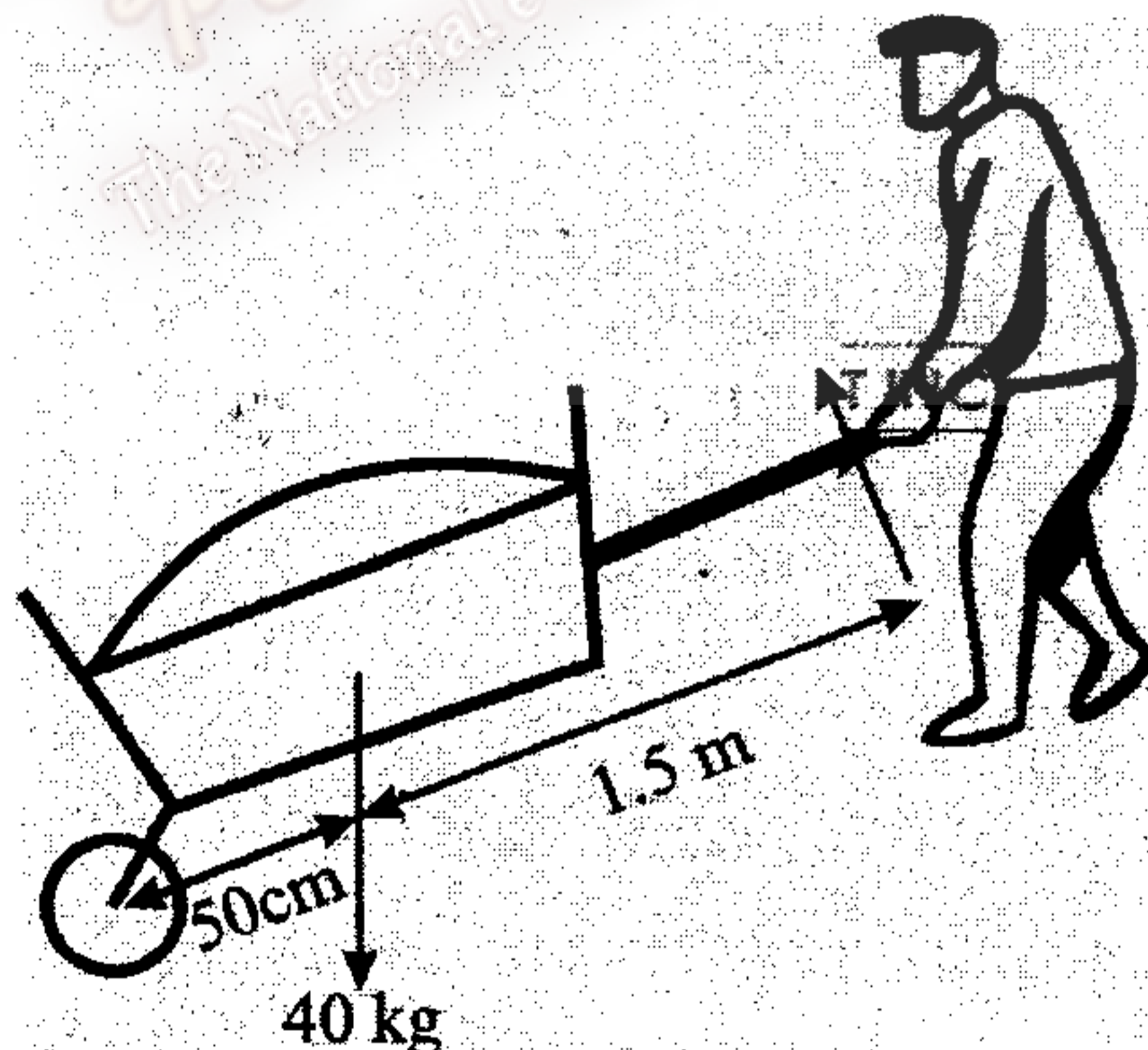
(8) (A) Living bodies are made up of a large number of chemical compounds. Studying about the chemical compounds of living bodies is the investigation of the chemical basis of life.

- (i) Name four main biological molecules in living bodies. (02 marks)
- (ii) Write down the test used to identify glucose in the laboratory and the observations of it. (02 marks)
- (iii) Name three main component in nucleotides which form DNA molecules. (03 marks)

(B) Reproduction is a characteristic of living organisms. It helps to maintain the continuity of life on the Earth.

- (i) What is known as "pollination"? (01 mark)
- (ii) Write two adaptations shown by plants to promote cross-pollination there by they discourage self pollination, with examples. (02 marks)

(C) Following diagram illustrates the way a man uses a wheel-barrow to transport a load of sand.



- (i) Calculate the weight of the sand (01 mark)
- (ii) Calculate the moment of force created by sand on the wheel. (02 marks)
- (iii) Calculate the force needed to lift the wheel barrow and the load, that is applied on the wheel barrow. (02 marks)
- (iv) Some people extend length of the arms of the wheel barrow. Explain this scientifically. (02 marks)
- (v) (a) Write one place where friction is applied in the wheel-barrow when it is pushed by the man. (01 mark)
- (b) Mention one strategy to reduce friction in that place. (01 mark)
- (vi) Man explains that the friction increases when the wheel-barrow is loaded with more sand. How do you explain this? (01 mark)

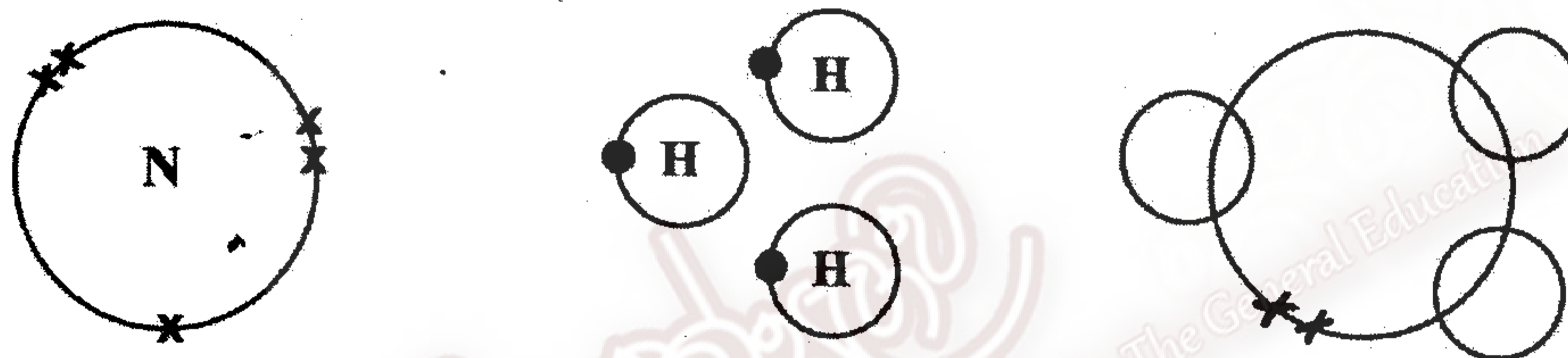
(9) (A) Atomic number of some elements are given below. Symbols given in the question are **not** standard symbols. Write down the answers using the given symbols.

elements	A	B	C	D	E	F	G
atomic numbers	3	6	8	11	12	17	18

- (i) Out of the above elements, what elements belong to the same group in the periodic table? (01 mark)
- (ii) What elements belong to the 2nd period? (01 mark)
- (iii) Write the symbol of the element that does not react with other elements under normal conditions. (01 mark)
- (iv) What is the chemical formula of the compound formed by C and D? (01 mark)
- (v) What is the type of chemical bond in the above chemical compound in port (iv)? (01 mark)

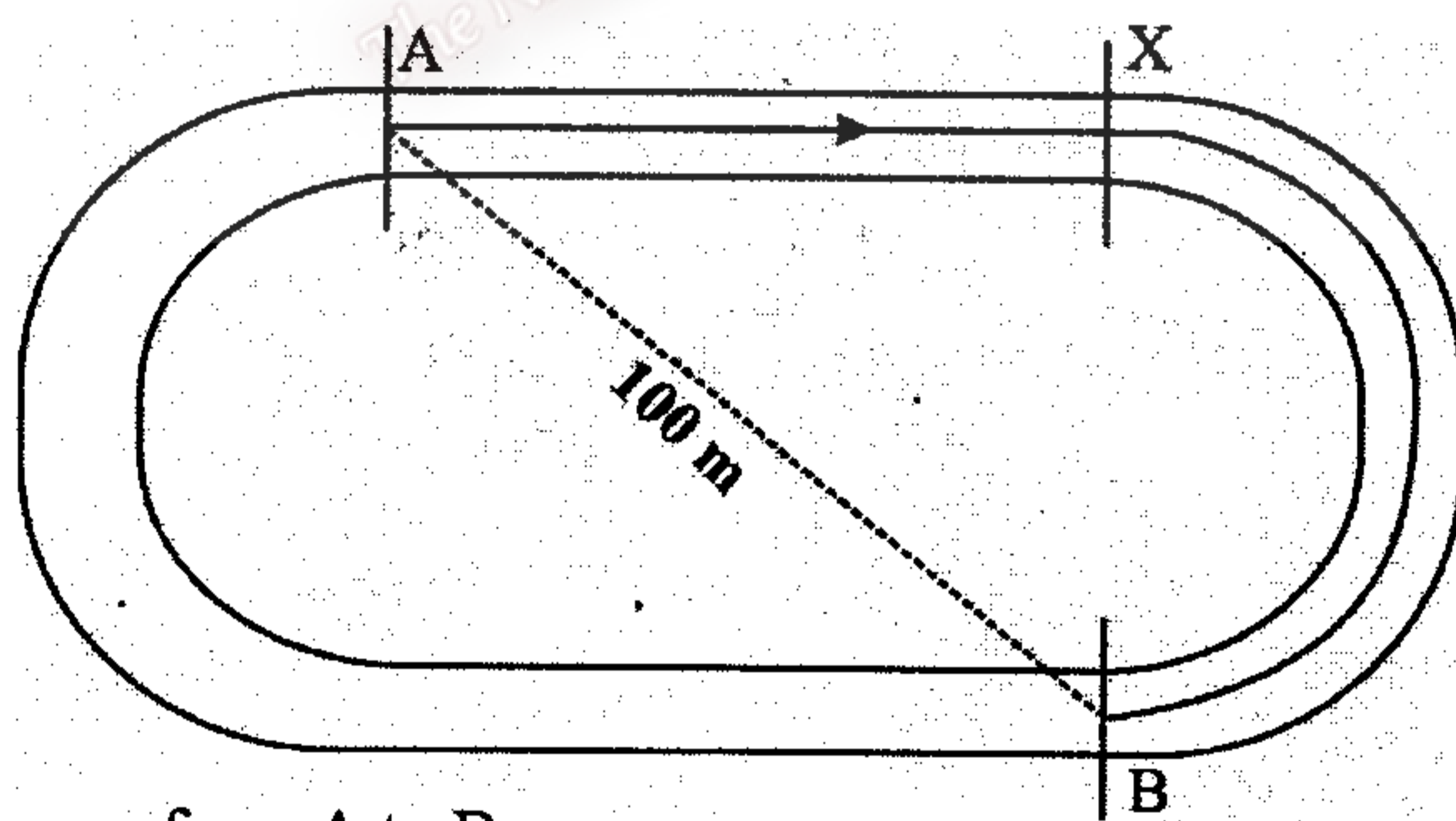
(B) Compound XY is formed when element X and element Y bond chemical ly. It is needed to find the type of chemical bond in XY compound. For that you are provided with a bulb, a dry cell, two carbon rods, wires, a beaker with water and XY compound.

- (i) Draw a diagram of an arrangement/set-up that can be used to identify the type of bond using the given substances and instruments. (01 mark)
- (ii) If the chemical bond type in XY is ionic, write one observation in the set-up. (01 mark)
- (iii) Write two properties of ionic compounds. (01 mark)
- (iv) Structure of an ammonia molecule was given as in the following manner in a leaflet.



- (a) Complete the structure of the ammonia molecule. (01 mark)
- (b) Type of chemical bond in ammonia is covalent. Write one feature of it to verify it. (01 mark)

(C) Following diagram illustrates an instance where an athlete competed half of a 400 m event.



- (i) When the athlete runs from A to B,
 (a) What is the displacement? (01 mark)
 (b) What is the distance travelled? (01 mark)
- (ii) Athlete took 25 seconds to run from A to B. Calculate his,
 (a) average speed. (01 mark)
 (b) convert it into kmh^{-1} unit (02 marks)
- (iii) Athlete reaches to the maximum velocity by 10 seconds. Then he runs with a uniform velocity in the remaining distance.
 (a) Draw the velocity-time graph (02 marks)
 (b) Calculate his acceleration (02 marks)
- (iv) If the mass of the athlete is 40 kg. Calculate the unbalanced force applied on him when he runs with the acceleration. (01 mark)