



CLASS: IX  
DATE:26/02/2023

MAX. MARKS: 80  
TIME: 3 HOURS

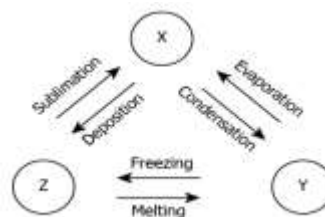
**General Instructions:**

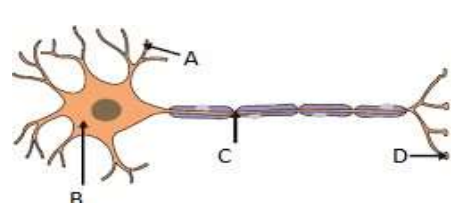
- This question paper consists of 39 questions in 5 sections.
- All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- Section A** consists of 20 objective type questions carrying 1 mark each.
- Section B** consists of 6 very short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
- Section C** consists of 7 short answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
- Section D** consists of 3 long answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
- Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

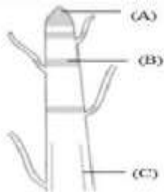
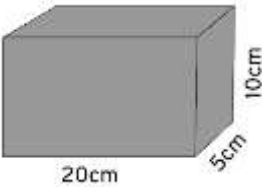
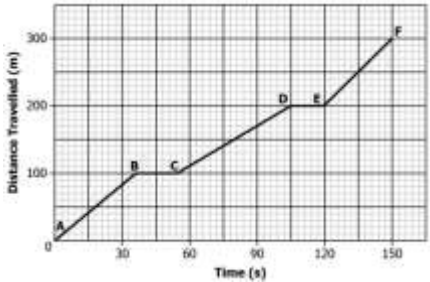
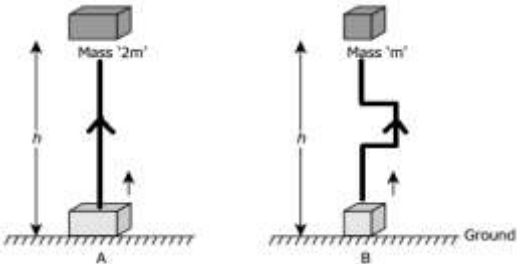
**SECTION – A**

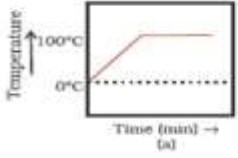
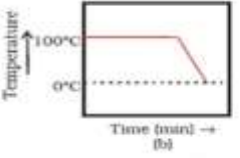
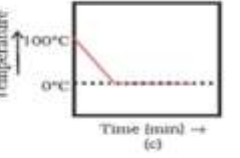
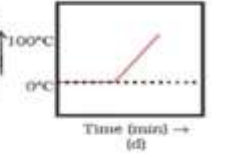
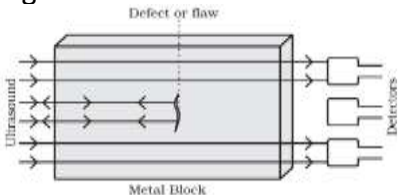
Select and write one most appropriate option out of the four options given for each of the questions 1 - 20

Q.No	Questions	Marks
1	Rakesh puts one drop of food colour in 100 ml of water and notices that the food colour gradually spreads in the water. What is the possible reason for this phenomenon? (a) A close arrangement of the water particles. (b) The ability of the water particles to move continuously. (c) Small intermolecular space between the water particles. (d) The ability of the water to stay warm at room temperature.	1
2	The image shows three substances that can change from one physical state to another by different processes. What are X, Y, and Z? (a) X - gas, Y - liquid, Z - solid (b) X - liquid, Y - solid, Z - gas (c) X - gas, Y - solid, Z - liquid (d) X - solid, Y - gas, Z - liquid	1
3	A student added 10g of iron filings and 10g of sulphur powder in a bowl. He brought a magnet over the bowl and noticed that iron filings were picked up by the magnet. He put sulphur and iron filings back into the bowl and heated it. After some time, he brought the magnet over it again. This time, the iron filings were not attracted to the magnet. The inference of the activity is; (a) the contents in the bowl before heating can be classified as a compound because they appear different. (b) the contents in the bowl after heating can be classified as a compound because they were attracted by the magnet. (c) the contents in the bowl after heating can be classified as a mixture because their properties changed after heating.	1



	(d) the contents in the bowl before heating can be classified as a mixture because they could be separated.																
4	In the Thomson's model of atom, which of the following statements are correct? (i) The positive charge is assumed to be uniformly distributed over the atom. (ii) The electrons are distributed in the positively charged sphere. (iii) Positive and negative charges are not equal in magnitude. (iv) The electrons attract each other to stabilise the atom. (a) (i) and (ii) (b) (i), (ii) and (iii) (c) (i) and (iv) (d) (i), (iii) and (iv)	1															
5	The table lists some compounds and their mass ratio. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>COMPOUND</th> <th>COMBINING ELEMENTS</th> <th>RATIO BY MASS</th> </tr> </thead> <tbody> <tr> <td>Calcium carbonate (CaCO<sub>3</sub>)</td> <td>Calcium, Carbon and oxygen</td> <td>10:3:12</td> </tr> <tr> <td>Carbon dioxide (CO<sub>2</sub>)</td> <td>Carbon, Oxygen</td> <td>4:3</td> </tr> <tr> <td>Magnesium sulphide (MgS)</td> <td>Magnesium, Sulphur</td> <td>3:4</td> </tr> <tr> <td>Nitrogen dioxide (NO<sub>2</sub>)</td> <td>Nitrogen, Oxygen</td> <td>7:16</td> </tr> </tbody> </table> <p>Which compound does NOT support the law of constant proportions?          (a) CaCO<sub>3</sub> (b) CO<sub>2</sub> (c) MgS (d) NO<sub>2</sub></p>	COMPOUND	COMBINING ELEMENTS	RATIO BY MASS	Calcium carbonate (CaCO <sub>3</sub> )	Calcium, Carbon and oxygen	10:3:12	Carbon dioxide (CO <sub>2</sub> )	Carbon, Oxygen	4:3	Magnesium sulphide (MgS)	Magnesium, Sulphur	3:4	Nitrogen dioxide (NO <sub>2</sub> )	Nitrogen, Oxygen	7:16	1
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6	The formula of a molecule is X <sub>2</sub> . One molecule of X <sub>2</sub> contains 18 protons. If the nucleon number of X is 19, how many neutrons are there in one atom of X? (a) 1 (b) 9 (c) 10 (d) 18	1															
7	Magnesium (Mg) and iron (Fe) react with oxygen (O) to form MgO and FeO. Although both compounds contain two atoms, each of their molecular masses are different. What is the reason for the difference in their molecular masses? (a) Difference in the atomic mass of iron and magnesium. (b) Difference in the number of iron and magnesium atoms. (c) Difference in the atomic number of iron and magnesium. (d) Difference in the number of oxygen atoms in the two compounds and their atomicity.	1															
8	The cell organelle that function as a passage for intercellular transport. (a) Endoplasmic reticulum (b) Ribosome (c) Plastids (d) Plasma membrane	1															
9	Observe the structure of neuron and select the correct label for the parts A, B, C and D.  (a) A-Axon, B-Dendrite, C-Nerve ending, D-Cell body (b) A-Cell body, B-Nerve ending, C-Axon, D-Dendrite (c) A- Dendrite, B-Cell body, C-Axon, D-Nerve ending (d) A-Nucleus, B-Dendrite, C-Cell body, D-Axon	1															
10	A cell will swell up if, (a) The concentration of water molecules in the cell is higher than the concentration of water molecules in the surrounding medium. (b) The concentration of water molecules in surrounding medium is higher than the concentration of water molecules in the cell. (c) The concentration of water molecules is same in the cell and in the surrounding medium. (d) The concentration of water molecules does not matter.	1															

11	<p>The given figure shows meristematic tissues with labels A, B, C and D. Identify the correct label with its functions.</p> <p>(a) A-Apical meristem-increases the thickness of root  (b) C-Lateral meristem-increases the girth of the stem  (c) A-Intercalary meristem-increases the length of the plant  (d) B-Apical meristem-elongates the internode</p> 	1
12	<p>The feed of broilers and layers are different because they have different nutritional requirements. How the feed of broilers differs from that of layers?</p> <p>(a) Broiler feed should have more carbohydrates and vitamin A.  (b) Broiler feed should have more proteins and fats.  (c) Broiler feed should have more carbohydrates and fats.  (d) Broiler feed should have less proteins and vitamins A and K.</p>	1
13	<p>Which situation among the following is accurate?</p> <p>(a) A body moving at a constant velocity can have acceleration in rectilinear motion .  (b) The magnitude of distance and displacement are equal in a circular motion.  (c) An object moving with acceleration can have uniform speed.  (d) Average speed and the magnitude of average velocity are always equal in circular motion.</p>	1
14	<p>A girl stands on a brick having 20cm length, 10cm height and 5cm width in three ways.</p>  <p>In which of the following case, pressure exerted by the brick will be maximum:</p> <p>(a) Length and height form the base  (b) Height and width form the base.  (c) Width and length form the base.  (d) Same in all the above three cases.</p>	1
15	<p>The graph given below shows the position of a car at different times.</p>  <p>Between which points the car travels the fastest?</p> <p>(a) A to B      (b) B to C      (c) C to D      (d) E to F</p>	1
16	<p>Compare the energy possessed by virtue of position for the two bodies shown below.</p>  <p>(a) The energy possessed by body A is half the energy possessed by body B.  (b) The energy possessed by body A is twice the energy possessed by body B.</p>	1

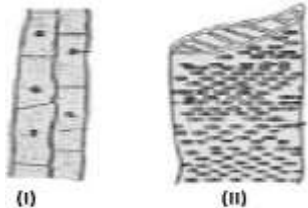
	(c) The energy possessed by body A is 4 times the energy possessed by body B. (d) The energy possessed by both Body A and Body B is the same.	
<p><b>Q. no 17 to 20 are Assertion - Reasoning based questions.</b>  <b>These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:</b>  <b>(a) Both A and R are true and R is the correct explanation of A</b>  <b>(b) Both A and R are true and R is not the correct explanation of A</b>  <b>(c) A is true but R is false</b>  <b>(d) A is False but R is true</b></p>		
17	<p><b>Assertion (A):</b> The size of the nucleus is very small as compared to the size of the atom.  <b>Reason (R) :</b> The electrons revolve around the nucleus of the atom.</p>	1
18	<p><b>Assertion (A):</b> Keeping bees for making honey has become an agricultural enterprise.  <b>Reason (R) :</b> Bee-keeping needs low investments.</p>	1
19	<p><b>Assertion (A):</b> RER looks rough under a microscope.  <b>Reason (R) :</b> It has particles called ribosomes attached to its surface.</p>	1
20	<p><b>Assertion (A):</b> Mass is a measure of inertia of the body in rectilinear motion.  <b>Reason(R) :</b> Greater the mass, greater is the force required to change its state of rest or uniform motion.</p>	1
<p><b>SECTION – B</b>  <b>Q. no. 21 to 26 are very short answer questions.</b></p>		
21	<p>A student heats a beaker containing ice and water. He measures the temperature of the content of the beaker as a function of time. Which of the following graph would correctly represent the result? Justify your choice.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>(a)</p> </div> <div style="text-align: center;">  <p>(b)</p> </div> <div style="text-align: center;">  <p>(c)</p> </div> <div style="text-align: center;">  <p>(d)</p> </div> </div> <p style="text-align: center;"><b>OR</b></p> <p>5ml of water was taken in a china dish and in a test tube separately. These samples were placed under different conditions as given below:          (i) Both the samples were kept under fan.          (ii) Both the samples were kept inside a cupboard.          (a) State in which case evaporation will be faster? Give reasons to support your answer.          (b) How will the rate of evaporation change if the above activity is carried out on a rainy day? Justify your answer.</p>	2
22	What would happen to the life of a cell if there was no Golgi apparatus?	2
23	<p>Name the following.</p> <p>(a) Name the tissue that forms the inner lining of our mouth.          (b) Name the tissue that stores fat in our body.          (c) Name the tissue present in the brain.          (d) Name the tissue that connects muscle to bone in humans.</p>	2
24	Mention the various factors for which crop variety improvement is done. (Any four)	2
25	<p>The diagram given below shows one of the industrial applications of ultrasound.</p> 	2

	<p>(a) What is ultrasound?  (b) Why longer wavelength of sound cannot be used for the above mentioned application?</p> <p style="text-align: center;"><b>OR</b></p> <p>(a) What is reverberation?  (b) How can reverberations in a big hall or auditorium be reduced?</p>	
26	Cattle feeds from various brands are available in the market. The high-yielding cattle of the present time need quality food. What are the two types of food requirements for dairy animals?	2
<b>SECTION - C</b> Q.no. 27 to 33 are short answer questions.		
27	<p>(a) A solution contains 30g of glucose, 20g of salt in 500ml of water (density of water = 1 g /ml). Calculate the mass percent of (i) glucose (ii) salt.  (b) (i) Name a non-metal which exists as a liquid at room temperature.  (ii) Name a lustrous non-metal.</p>	3
28	<p>Give reason for the following statements:  (a) Immersion rods for heating liquids are made up of metallic substances.  (b) Particles of a colloidal solution do not settle down when left undisturbed, while they do in the case of a suspension.  (c) We can get the smell of perfume sitting several metres away.</p>	3
29	<p>(a) After adding salt to vegetables while cooking, the vegetables will release water. What might be the reason behind this?  (b) Name the waste disposal system that acts as the suicide bag of the cell.  (c) Why the mitochondria regarded as 'strange cell organelle'?</p> <p style="text-align: center;"><b>OR</b></p> <p>(a) Why is the plasma membrane called a selectively permeable membrane?  (b) The flexibility of the cell membrane enables some cells to engulf food and other material from their external environment. Identify the process. Give one example.</p>	3
30	<p>(a) Express average velocity when the velocity of a body changes at (i) non-uniform rate and (ii) uniform rate.  (b) An athlete completes one round of a circular track of diameter 200 m in 40 s. What will be the distance covered and the displacement at the end of 2 minutes 20 s?</p>	3
31	<p>(a) What is the importance of Newton's universal law of gravitation? (two points)  (b) Write any two differences between acceleration due to gravity (g) and universal Gravitational constant (G).</p>	3
32	<p>(a) When a bullet is fired from a gun, the gun gets recoiled. Explain.  (b) Velocity-time graph of a ball of mass 50g rolling on a concrete floor is shown below. Calculate the acceleration and the frictional force of the floor on the ball.</p> <div style="text-align: center;"> <p style="text-align: center;"><b>OR</b></p> <p>A bullet of mass 50g moving with an initial velocity of 100m/s, strikes a wooden block and comes to rest after penetrating 2cm into it. Calculate the:</p> <p>(a) initial momentum of the bullet.  (b) final momentum of the bullet.</p> </div>	3

	(c) retardation caused by the wooden block. (d) resistive force exerted by the wooden block.	
33	<p>Epicardial adipose tissue (EAT) is a type of visceral fat in the heart. It lies between the myocardium, the thick muscular layer of the heart muscle, and the pericardium, the thin sac that surrounds the heart. Unlike subcutaneous fat, which is under your skin, visceral fat surrounds your organs and can cause health problems.</p> <p>EAT is associated with several heart conditions, including cardiovascular disease and abnormal rhythms called arrhythmias. Weight loss and certain medications can sometimes lower EAT levels and improve heart health.</p> <p>(a) Which substance is present in the adipocytes? What role do they play? (any two) (b) Animals from colder regions and fishes from colder waters have a thicker layer of subcutaneous fat. Describe why?</p>	3

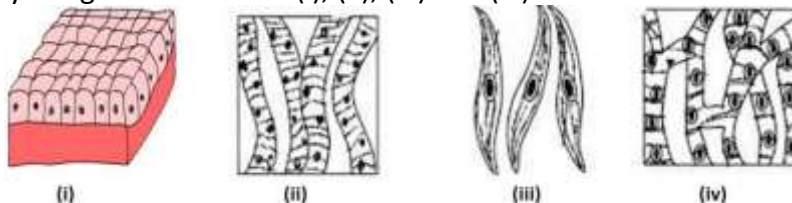
**SECTION – D**

Q.no. 34 to 36 are Long answer questions

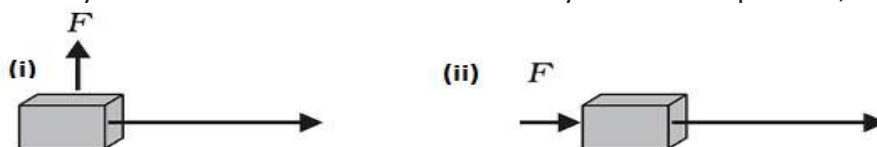
34	<p>Number of electrons, protons and neutrons in chemical species A, B, C, D and E is given below. Study the given data and answer the following questions:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Elements</th> <th>Electrons</th> <th>Protons</th> <th>Neutrons</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>11</td> <td>11</td> <td>12</td> </tr> <tr> <td>B</td> <td>10</td> <td>10</td> <td>10</td> </tr> <tr> <td>C</td> <td>8</td> <td>8</td> <td>8</td> </tr> <tr> <td>D</td> <td>8</td> <td>8</td> <td>10</td> </tr> <tr> <td>E</td> <td>9</td> <td>9</td> <td>10</td> </tr> </tbody> </table> <p>(a) Which is an inert gas? Why? (b) What is the relationship between two elements C and D whose mass numbers are 16 and 18 respectively but their atomic numbers are 8. Are their chemical properties same or different? (c) Show diagrammatically the electron distribution in element E. (d) Is element A - a metal or a non-metal? Why? (e) An atom of element B contains 10 electrons, 10 protons and 10 neutrons. What is the name of an element? How many valence electrons are there in element C?</p> <p align="center"><b>OR</b></p> <p>(a) An element X has an atomic number 12 and mass number 24. Draw a diagram showing the distribution of electrons in the orbits and mention the nuclear composition of the neutral atom of the element X. (b) Write any two observations of Rutherford's model of an atom from <math>\alpha</math>-ray scattering experiment. (c) An ion <math>M^{3-}</math> contains 10 electrons and 7 neutrons. What is the atomic number and mass number of the element M?</p>	Elements	Electrons	Protons	Neutrons	A	11	11	12	B	10	10	10	C	8	8	8	D	8	8	10	E	9	9	10	5
Elements	Electrons	Protons	Neutrons																							
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C	8	8	8																							
D	8	8	10																							
E	9	9	10																							
35	<p>Give reasons:</p> <p>(a) The branches of a tree move and bend freely in high velocity. (b) Meristematic cells have a prominent nucleus and dense cytoplasm, but they lack a vacuole. (c) It is difficult to pull out the husk of coconut. (d) Identify the given structures (i) and (ii).</p> <div style="text-align: center;">  <p>(i)                      (ii)</p> </div>	5																								

OR

- (a) Structure A and B constitute tissue C. A carries water with dissolved minerals whereas B carries food produced by photosynthesis. Identify A, B and C.
- (b) Explain why, Water hyacinth floats on water surface.
- (c) Identify the given structures (i), (ii), (iii) and (iv).



- 36 (a) In each of the following, a force  $F$  is acting on an object of mass  $m$ . The direction of displacement is from west to east shown by the longer arrow. Observe the diagrams carefully and state whether the work done by the force is positive, negative or zero.



- (b) An object of mass,  $m$  is moving with a uniform velocity  $u$  in a horizontal path. Work done on this object is equal to its change in kinetic energy. Derive an expression to calculate the work done in this situation.
- (c) What kind of energy transformation takes place when a body is dropped from a certain height?
- (d) Two boys **A** and **B** each of weight 600N climb up a rope through a height of 9m. Boy **A** takes 15s and boy **B** takes 20s to accomplish this task. What is the power expended by each boy?

SECTION - E

Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.

- 37 Atoms form ions by loss or gain of electrons. The ions that contain a greater number of protons than electrons are known to hold a net positive charge. These ions are commonly referred to as cations. On the other hand, the ions that contain a greater number of electrons than protons are known to hold a net negative charge. These ions are commonly known as anions. Polyatomic ion is an ion that contains more than one atom. This differentiates polyatomic ions from monatomic ions, which contain only one atom.
- (a) (i) Write the valency of anion in the following compounds: (1) Aluminium nitride (2) Copper (II) sulphate.
- (ii) The atomic number of four elements A, B, C and D are 9, 10, 13 and 12 respectively. Which of them will form a cation?
- (b) Write chemical formula for the following compounds by Criss cross method:  
(1) Zinc oxide (2) Ammonium phosphate.
- OR
- (b) (i)  $XCl_2$  is the chloride of metal X. State the formula of hydrogen carbonate and hydroxide of the metal X respectively.
- (ii) Sulphur atom is electrically neutral, but sulphide is a charged ion. Explain.

- 38 Weeds account for about one-third of the total agricultural loss. Therefore, the efforts to improved productivity in agriculture in India should include efforts to decrease losses caused by weeds. Weeds are the most severe and widespread biological constraint to agricultural production systems and cause damage in cropped and non-cropped lands.

They reduce crop yield and degrade quality of the produce besides raising cost of production. In addition to yield and nutrient losses, weeds also harbor and serve as alternate hosts to several insect pests and diseases and may reduce land value.

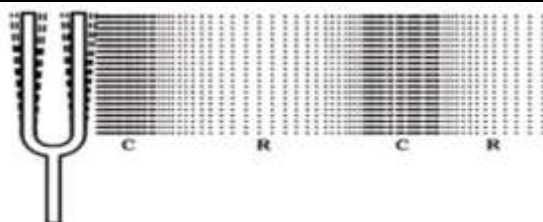
(Source: Crop Protection, Volume 134, August 2020, 104451)

- (a) *Parthenium*, *Xanthium*, *Cyperinus rotundus* are the common weeds growing in our farms. Why is it said to be essential for a good harvest to remove weeds from cultivated fields during the early stages of crop growth?
- (b) 'Field crops are infested by a large number of weeds, insect pests and diseases. If weeds and pests are not controlled at the appropriate time, then they can damage the crops so much that most of the crop is lost'. How do insect pests attack our crops? (any two points).
- (c) Discuss why pesticides are used in very accurate concentration and in very appropriate manner?

**OR**

- (c) An Italian bee variety, *Apis mellifera*, has been brought in to increase yield of honey. Mention the advantages of keeping the Italian bee other than native varieties. (any two).

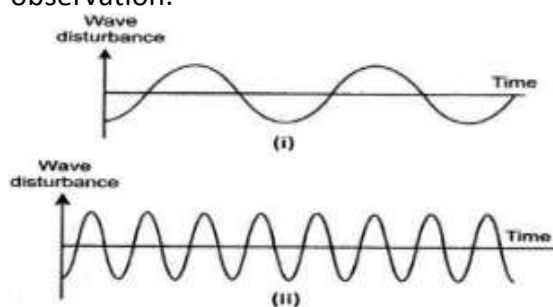
39



4

A tuning fork is a fork-shaped acoustic resonator used in many applications to produce a fixed tone. It resonates at a specific constant pitch when set vibrating by striking it against a surface or with an object and emits a pure musical tone once the high overtones fade out. A tuning fork's pitch depends on the length and mass of the two prongs. A vibrating tuning fork creates compressions and rarefactions as the prongs move back and forth.

- (a) As the sound waves passes through air, it produces regions of high and low pressure. State the names of i) high pressure and ii) low pressure regions.
- (b) Sound waves produced by two different vibrating tuning forks are as shown in the diagram given below. Which diagram represents high pitch sound? Give reason for your observation.



- (c) What is the relation between 'time-period' and 'frequency' of a sound wave? If a source of sound produces 20 compressions and 20 rarefactions in air in 0.2 seconds, find the frequency of sound produced.

**OR**

- (c) How is the wavelength and frequency of a sound wave related to its speed? If velocity of sound in air is 340 m/s, calculate:
  - (i) wavelength when frequency is 256 Hz.
  - (ii) frequency when wavelength is 0.85 m

\*\*\*\*\*THE END\*\*\*\*\*



