

VIKAS BHARATI PUBLIC SCHOOL
SAMPLE PAPER (SESSION - 2023-24)
CLASS IX
SUBJECT: SCIENCE

Time: 3 hrs

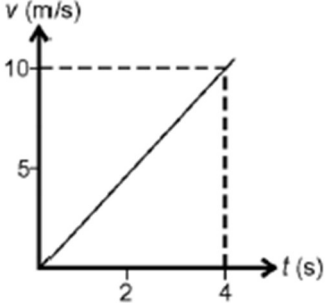
M.M.:80

General Instructions:

- i. This question paper consists of 39 questions in 5 sections covered in 6 pages.
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- iii. Section A consists of 20 objective type questions carrying 1 mark each.
- iv. 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.
- v. 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.
- vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
- vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION A		
Select and write the most appropriate option out of the four options given for each of the questions 1 - 20. There is no negative mark for incorrect response.		
1.	Which of the following is not a characteristic of matter? (a) Matter is made up of extremely small particles (b) There is no space between particles of matter (c) The particles of matter are continuously moving (d) The particles of matter attract each other.	1
2.	Shivam visited an LPG unit and found that the gas can be liquified at specific conditions of temperature and pressure. Help him to identify the correct set of conditions. (a) High temperature and high pressure. (b) Low temperature and low pressure. (c) Low temperature and high pressure. (d) High temperature and low pressure.	1
3.	The mass of sodium in 5.85 g of NaCl is (a) 2.3 g (b) 3.5 g (c) 5.8 g (d) 0.23 g	1
4.	Which of the following statements is true? (a) Homogeneous mixtures can have variable composition (b) Homogeneous mixtures fixed composition (c) Heterogeneous mixtures have fixed composition (d) Salt solution is heterogeneous mixture.	1

5.	<p>The property to flow is unique to fluids. Which one of the following statements is correct?</p> <p>(a) Only gases behave like fluids (b) Gases and solids behave like fluids (c) Gases and liquids behave like fluids (d) Only liquids are fluids</p>	1
6.	<p>Two elements A and B combine to form the compound AB_2, which of the following statement is true?</p> <p>(a) It is homogenous. (b) The properties of AB_2 are different from A and B. (c) It is pure substances. (d) All of these</p>	1
7.	<p>All noble gases are</p> <p>(a) Monoatomic (b) Diatomic (c) Triatomic (d) Polyatomic</p>	1
8.	<p>In plant cells, many substances important for life are stored in</p> <p>(a) plastids (b) mitochondria (c) vacuoles (d) lysosomes</p>	1
9.	<p>Branched involuntary muscle fibres are found in</p> <p>(a) limbs (b) ureters (c) heart (d) tongue</p>	1
10.	<p>The substance found in the cell wall of cork or bark that makes it impervious to water is</p> <p>(a) lignin (b) cutin (c) suberin (d) pectin</p>	1
11.	<p>Areolar tissue is a type of (i)_____ tissue and is found in (ii)_____</p> <p>(a) (i) connective (ii) bone marrow (b) (i) muscular (ii) heart (c) (i) connective (ii) around nerves (d) both (i) and (iii).</p>	1
12.	<p>Most of the metabolic functions of plants are carried out by</p> <p>(a) parenchyma (b) collenchyma (c) sclerenchyma (d) meristems</p>	1

13.	<p>Pranesh is in seat number 48 of a train moving with a speed of 18 km/h and Srinidhi is standing on the platform. Then</p> <p>A : Pranesh is at rest according to another passenger in the train. B : Srinidhi is moving according to Pranesh C : Pranesh is moving according to Srinidhi D : Pranesh is moving according to the train</p> <p>Then the incorrect options are</p> <p>(a) A, D (b) B, C (c) B, D (d) Only D</p>	1	
14.	<p>The $v - t$ graph of a body of 5 kg moving with the help of a force is shown. Then the force involved is</p> <p>(a) 20 N (b) 125 N (c) 12.5 N (d) 2.0 N</p>		1
15.	<p>Acceleration due to gravity on the surface of the earth is the greatest</p> <p>(a) at poles (b) at equator (c) at 23.6° latitude (d) uniform at all places</p>	1	
16.	<p>Rutherford's α-scattering experiment led to the conclusion that</p> <p>(a) mass and energy are inter-related (b) the mass and the positive charge of an atom are concentrated in the nucleus (c) neutrons are present in the nucleus (d) atoms are electrically neutral.</p>	1	
<p>Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:</p> <p>a) Both A and R are true, and R is the correct explanation of A. b) Both A and R are true, and R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true</p>			
17.	<p>Assertion : When the displacement of a body is directly proportional to the square of the time. Then the body is moving with uniform acceleration. Reason : The slope of velocity-time graph with time axis gives acceleration.</p>	1	
18.	<p>Assertion : Compression and rarefaction involve changes in density and pressure. Reason : When particles are compressed, density of medium increases and when they are rarefied, density of medium decreases.</p>	1	
19.	<p>Assertion : True solution exhibits Tyndall effect. Reason : Particles are very small in size.</p>	1	
20.	<p>Assertion: The size of the nucleus is very small as compared to the size of the atom. Reason: The electrons revolve around the nucleus of the atom</p>	1	

SECTION B		
Question No. 21 to 26 are very short answer questions		
21.	Draw a neat diagram of a typical animal cell and label any two parts.	2
22.	Why is mitochondria called ‘power-house of cell’? Which molecule is known the ‘energy currency ‘ of the cell?	2
23.	Distinguish between hypotonic solution and hypertonic solution. OR Which organelle is the most prominent and important structure in a cell, and also acts as the control centre of the cell and why?	2
24.	The masses of scooter and bike are in the ratio of 2 : 3, but both are moving with the same speed of 108 km/h. Compute the ratio of their kinetic energy.	2
25.	A sound wave travels at a speed of 339 m/s. If the wavelength is 1.2 cm, what is the frequency of the wave? OR (a) What is audible range of the average human ear? (b) Explain how ultrasound is used to clean spiral tubes and electronic components?	2
26.	Differentiate between prokaryotes and eukaryotes.	2
SECTION C		
Question No. 27 to 33 are short answer questions		
27.	a) What happens to an element ‘Z’ if its atom gains three electrons? b) Explain Thomson’s model of an atom?	3
28.	(a) Write the formulae of: i) Sodium sulphate ii) Calcium hydroxide OR (a) Calculate the formula unit mass of $(\text{NH}_4)_2\text{CO}_3$. [Atomic mass of N = 14 u, H = 1 u, C = 12 u, O = 16 u] (b) An atom of an element has 7 electrons in its L shell. (i) What is its atomic number? (ii) State its valency.	3
29.	(a) Name a farming system with minimal or no use of chemical fertilizers. (b) Which one of the following is not a part of the biotic environment? Man, Air, Trees, Insects (c) How agronomic characters affect cultivation practices and crop yield?	3
30.	Define animal husbandry. Why livestock production needs to be improved?	3
31.	(a) A particle moves 3 m north then 4 m east and finally 6 m south. Calculate the displacement. (b) Why in a graph plotted between distance and time, we always put time on x-axis and distance on y-axis?	3
32.	(a) Show that the first law of motion can be mathematically stated from the mathematical expression for the second law of motion. (b) Which physical quantity corresponds to the rate of change of momentum?	3
33.	(a) A body of mass 20 kg is placed on an area 2m^2 . Find the pressure exerted.	3

	(b) Why does an object float or sink when placed on the surface of a liquid?										
	SECTION D Question No. 34 to 36 are long answer questions.										
34.	<p>(a) Derive an expression for kinetic energy possessed by an object of mass m, moving with velocity v. Also state the SI unit of kinetic energy.</p> <p>(b) A ball of mass 400 g rolls on a ground with uniform speed of 25 m/s. Find the kinetic energy possessed by it.</p> <p style="text-align: center;">OR</p> <p>(a) Justify that “a body at a greater height has larger energy”.</p> <p>(b) A body of mass 2 kg is thrown up at a velocity of 10 m/s. Find the kinetic energy of the body at the time of throw. Also, find the potential energy of the body at the highest point. The value of $g = 10 \text{ m/s}^2$.</p>	5									
35.	<p>(a) What were the conclusions of Rutherford’s α-particle scattering experiment.</p> <p>(b) Draw the electronic structure of element X with atomic number 17 and element Y with atomic number 16? Also identify element X and Y.</p> <p>(c) Give any three uses of isotopes.</p> <p style="text-align: center;">OR</p> <p>(a) Composition of the nuclei of two atomic species ‘X’ and ‘Y’ are given below.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">X</td> <td style="text-align: center;">Y</td> </tr> <tr> <td>Protons</td> <td style="text-align: center;">8</td> <td style="text-align: center;">8</td> </tr> <tr> <td>Neutrons</td> <td style="text-align: center;">8</td> <td style="text-align: center;">10</td> </tr> </table> <p>(i) Write the mass number of X and Y respectively.</p> <p>(ii) Write the electronic configuration of the element ‘X’.</p> <p>(iii) Is there any similarity between X and Y? How are they related to each other?</p> <p>(b) How many protons does He^{2+} ion possess?</p> <p>(c) How many electrons can be filled in the third orbit of an atom at a maximum?</p>		X	Y	Protons	8	8	Neutrons	8	10	5
	X	Y									
Protons	8	8									
Neutrons	8	10									
36.	<p>(a) What do you mean by a meristematic tissue?</p> <p>(b) Mention different types of meristematic tissues present in plants. Draw a diagram showing the three types of meristematic tissues.</p> <p style="text-align: center;">OR</p> <p>Write two functions each of connective tissue and muscular tissue? Also draw the diagram of striated and non-striated muscle fibres.</p>	5									
	SECTION – E Question 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.	<p>The individual particles of the medium move in a direction parallel to the direction of propagation of the disturbance. The particles do not move from one place to another, but they simply oscillate back and forth about their position of rest. This is exactly how a sound wave propagates; hence sound waves are longitudinal waves. There is also another type of wave, called a transverse wave. In a transverse wave particle do not oscillate along the direction of wave propagation but oscillate up and down about their mean position as the wave travels. Thus, a transverse wave is the one in which the individual particles of the medium move about their mean positions in a direction perpendicular to the direction of</p> <p>(a) What distinguishes a transverse wave from a longitudinal wave?</p>	4									

	<p>(b) What is the basic difference between echo and reverberation?</p> <p style="text-align: center;">OR</p> <p>(b) Name any two animals that can detect ultrasound.</p> <p>(c) A person makes sound near a obstacle and heard the echo after 1 s. What is the distance of the obstacle from the person if the speed of the sound, v is taken as 346 m/s?</p>	
38.	<p>According to Dalton's atomic theory, all matter whether an element, a compound, or a mixture is composed of small particles called atoms which can neither be created nor destroyed during a chemical reaction. Dalton's theory provides a simple explanation for the laws of chemical combination. He used his theory to explain the law of conservation of masses, the law of constant proportions, and the law of multiple proportions, based on various postulates of the theory. Dalton was the first scientist to use the symbols for the elements in a very specific sense. When he used a symbol for an element he also meant a definite quantity of that element, that is one atom of that element.</p> <p>(a) Write any two diatomic molecules.</p> <p style="text-align: center;">OR</p> <p>(a) Write the names of the following compounds: (i) $Al_2(SO_4)_3$ (ii) NH_4OH</p> <p>(b) (i) The oxide of aluminium has a chemical formula Al_2O_3. State the valency of Al. (ii) What is the formula of Calcium chloride?</p> <p>(c) When 5 g of calcium is burnt in 2 g of oxygen then 7 g of calcium oxide is produced. What mass of calcium oxide will be produced when 5 g of calcium is burnt in 20 g of oxygen. Which law of chemical combination will govern your answer?</p>	4
39.	<p>Plasma membrane or Cell membrane is the outermost covering of the cell that separates the contents of the cell from its external environment. The flexibility of the cell membrane also enables the cell to engulf in food and other material from its external environment. Such processes are known as endocytosis.</p> <p>Water obeys the law of diffusion. The movement of water molecules through such a selectively permeable membrane is called osmosis. The movement of water across the plasma membrane is also affected by the amount of substance dissolved in water.</p> <p>(a) What is the plasma membrane made up of?</p> <p>(b) Name the movement of a substance from the region of higher concentration to the region where its concentration is lower is low.</p> <p>(c) Why cell membrane is known as selectively permeable membrane?</p> <p style="text-align: center;">OR</p> <p>(c) State two differences between cell membrane and cell wall.</p>	4