

**St. John's High School**  
**Sector 26, Chandigarh**  
**Periodic Assessment -2 (2023-24)**  
**Subject: Science**  
**Class: 9**

**Time: 3 hrs**

**M.M: 80**

**General Instructions:**

- i. This question paper consists of 39 questions in 5 sections. All questions are compulsory.
- ii. Section A consists of 20 objective-type questions carrying 1 mark each.
- iii. Section B consists of 6 Very Short questions carrying 02 marks each.
- iv. Section C consists of 7 Short Answer type questions carrying 03 marks each.
- v. Section D consists of 3 Long Answer type questions carrying 05 marks each.
- vi. Section E consists of 3 source-based/case-based questions of 04 marks each with sub-parts.

**Section A**

1. Sieve tubes and companion cells are present in:  
A. Xylem  
B. Phloem  
C. Cork  
D. Cambium
  
2. The diagram of chlorenchyma tissue can be correctly identified by:  
a) a long fibre-like shape and absence of cytoplasm  
b) the presence of chlorophyll  
c) large nuclei and pits in the cell membrane  
d) thin cell wall and dense cytoplasm  
A. Only a is correct  
B. Both b and c are correct  
C. Both b and d are correct  
D. All are correct
  
3. The size of the stem increases in the width due to:  
A. Intercalary meristem  
B. Apical meristem  
C. Lateral meristem  
D. both B and C

4. A cell will not show a change in its shape if:
- The concentration of water molecules in the cell is higher than the concentration of water molecules in the surrounding medium.
  - The concentration of water molecules in the surrounding medium is higher than the concentration of water molecules in the cell.
  - The concentration of water molecules is the same in the cell as in the surrounding medium.
  - The concentration of water molecules does not matter.
5. Which of the following is a characteristic of a prokaryotic cell?
- Presence of well-defined nucleus
  - Presence of membrane less organelles
  - Presence of ribosomes that synthesize proteins
  - Presence of more than one chromosome
6. Match the following:

	Column A		Column B
a)	Golgi Apparatus	i)	Waste disposal system
b)	Ribosome	ii)	Production of Energy
c)	Mitochondria	iii)	Protein synthesis
d)	Lysosome	iv)	Packaging

- a)-i), b)-ii), c)-iii), d)-iv)
  - a)-iv), b)-iii), c)-ii), d)-i)
  - a)-iii), b)-i), c)-iv), d)-ii)
  - a)-ii), b)-iii), c)-iv), d)-i)
7. The maximum number of electrons in the M shell cannot exceed 18.
- True, because for M shell,  $n=2$
  - True, because for M shell,  $n=3$
  - False, because M is the third shell
  - False, because M is the innermost shell.
8. Which postulate of Dalton's atomic theory is in agreement with the law of constant proportions?
- The matter is made up of tiny indivisible particles called atoms.
  - Atoms can neither be created nor destroyed.
  - Atoms of the same element are identical: Atoms of the same element have the same size, mass, and other properties.
  - Atoms combine in simple whole-number ratios to form compounds. The number and type of atoms in a compound is fixed.



16. In a tug of war, when the rope does not move in any direction, the net force is  
A. zero  
B. low  
C. high  
D. cannot say

17. When we jump out of the boat standing in still water, the boat moves  
A. forward  
B. backwards  
C. sideways  
D. doesn't move

**DIRECTIONS:**

Q.18 to 20 are Assertion- Reason questions. Choose the most appropriate option for each.

- A. Both A and R are true and R is the correct explanation of assertion.  
B. Both A and R are true but R is not the correct explanation of assertion.  
C. A is true but R is false.  
D. A is false and R is true.

18. **Assertion (A):** The molecular mass of water ( $H_2O$ ) is  $20u$

**Reason (R):** The atomic mass of a hydrogen atom is  $1u$  and atomic mass of an oxygen atom is  $16u$ .

19. **Assertion (A):** To hear a distinct echo, the time interval between the original sound and the reflected one must be at least  $0.1$  s.

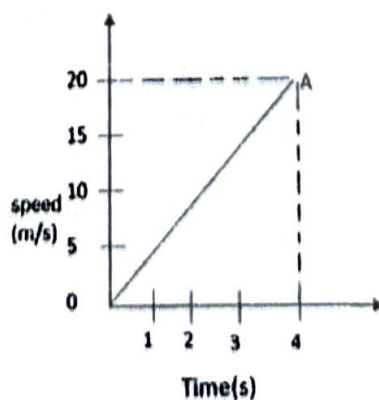
**Reason (R):** The sensation of sound persists in our brain for about  $0.1$  s.

20. **Assertion (A):** Animal cells do not have cell walls as plant cells have.

**Reason (R):** Animal cells only undergo mitotic cell division whereas plant cell undergoes both mitotic and meiotic cell division.

**Section B**

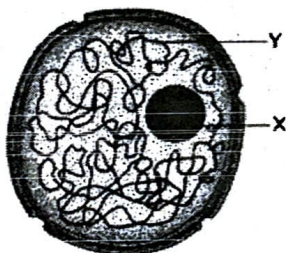
21. Differentiate between longitudinal wave and transverse wave. Give one example of each type.
22. a) Why is it advised to tie any luggage kept on the roof of a bus with a rope?  
b) A rubber ball and stone are of the same size. Which one has more inertia?
23. Find the distance covered by a particle during the time interval  $t=0$  and  $t=4s$  for which the speed time graph is shown in figure:



24. Compare the properties of electrons and protons on the basis of their charge and location.
25. a) If the given reaction is in agreement with the "Law of conservation of mass", what is the amount of Carbon dioxide formed in the given reaction?
- Sodium carbonate + Ethanoic Acid  $\rightarrow$  Sodium ethanoate + CO<sub>2</sub> + H<sub>2</sub>O
- (6.3 g) (6 g) (8.2 g) (?) (0.9 g)
- b) Give the statement of the law mentioned above.
26. Write two characteristics of phloem tissue.

### Section C

27. Answer the following questions (1x3)
- a) Write two structural characteristics of sclerenchyma.
- b) Why is Epidermis referred to as a protective layer?
- c) Why is aerenchyma tissue found in Lotus?
28. Redraw the given picture and label X (the dark circle) and Y (the curvy lines). Write a function of Y. (1+1+1)



29. State the second law of motion. Derive the mathematical expression for this law. (1+2)
30. Velocity-time graph for the motion of an object in a straight path is a straight line parallel to the time axis.
- a) Identify the nature of motion of the body.
- b) Find the acceleration of the body.
- c) Draw the shape of distance-time graph for this type of motion. (1x3)
31. a) When we put our ear onto a railway line, we can hear the sound of an approaching train even when the train is far off but its sound cannot be heard through the air. Give reason.
- b) Why are the ceilings of concert halls curved?

32. Complete the given table:

ATOMIC NUMBER	MASS NUMBER	NUMBER OF PROTONS	NUMBER OF NEUTRONS	NAME OF THE ELEMENT
18	40	18		
15		15		Phosphorus

(0.5x6)

33. Devise the chemical formulae of:

a) Aluminium sulphate

b) Magnesium chloride

(1.5x2)

#### Section D

34. a) Describe Bohr's model of an atom

b) The average atomic mass of a sample of an element X is 16.2u. What is the percentages of isotopes X-16 and X-18 in the sample? (2+3)

35. A car is moving at a rate of 72 km/h and applies brakes to provide retardation of  $5\text{m/s}^2$

a) How much time does the car take to stop?

b) How much distance does the car cover before coming to rest?

c) What would be the stopping distance needed if speed of the car is doubled, other conditions remaining same.

36. a) Draw a neat diagram of an animal cell.

b) Identify the given parts (**any three**) and label in the diagram you have drawn.

i) Strange organelles with their own DNA

ii) Organelle with powerful digestive enzymes.

iii) the fluid content inside the plasma membrane.

iv) called nucleoid in a prokaryotic cell

(2+3)

#### **SECTION E**

37. Read the given passage and answer the questions that follow:

The **cohesion-tension** hypothesis is the most widely-accepted model for movement of water in vascular plants. Cohesion-tension essentially combines the process of capillary action with **transpiration**, or the evaporation of water from the plant stomata.

Transpiration is ultimately the main driver of water movement in xylem. The cohesion-tension model works like this:

- **Transpiration** (evaporation) occurs because stomata are open to allow gas exchange for photosynthesis. As transpiration occurs, it deepens the meniscus of water in the leaf, creating negative pressure (also called **tension** or suction).
- The **tension** created by transpiration “pulls” water in the plant xylem, drawing the water upward in much the same way that you draw water upward when you suck on a straw.
- **Cohesion** (water sticking to each other) causes more water molecules to fill the gap in the xylem as the top-most water is pulled toward the stomata.

a) Water is a *polar* molecule, meaning that it’s slightly “sticky”—it forms temporary hydrogen bonds with itself. This creates .....

- |             |                  |
|-------------|------------------|
| A. Tension  | B. Transpiration |
| C. Cohesion | D. Translocation |

b) Name the process which is the main driver of water movement in xylem?

- |             |                  |
|-------------|------------------|
| A. Tension  | B. Transpiration |
| C. Cohesion | D. Translocation |

c) The transport of water through xylem will .....on a less humid day?

- |                     |                    |
|---------------------|--------------------|
| A. decrease         | B. increase        |
| C. not get affected | D. remain the same |

d) Transport through xylem depends on transpiration. Agree/Disagree

38. Several animal species can hear frequencies well beyond the human hearing range. Some dolphins and bats, for example, can hear frequencies up to 10,000Hz. Elephants can produce and hear sound at 14-16 Hz while whales can hear sounds as low as 7Hz (in water).

a) Elephants communicate with each other using sounds of a particular frequency. We cannot hear these sounds. Name the sound waves produced by them.

b) Choose the correct option as to why we cannot hear those sounds.

- A. the amplitude of their sound wave is too high.
- B. the frequency of their sound wave is too low.
- C. the speed of their sound wave is too fast
- D. the speed of their sound wave is too slow

c) There are two elephants A&B standing at a distance of 2500m from each other.

Elephant A emits a communication sound when Elephant B hears it and sends an answering call. Elephant A hears the answering call from elephant B. Find the minimum time for elephant A to call and hear an answer from elephant B. (speed of sound is 340m/s)

39. Observe the given table and answer the questions that follow

	carbon-12 (stable)	carbon-13 (stable)	carbon-14 (radioactive)
protons	6	6	6
atomic number	6	6	6
neutrons	6	7	8
mass number	12	13	14
electrons	6	6	6

- a). What is the common name given to such species of elements?  
 A. Isotopes                      B. Isobars                      C. cations                      D. anions
- b). Identify the valency of carbon-12, carbon-14 and carbon-13 respectively  
 A. 2,4,3                      B. 3,3,3                      C. 2,2,2.                      D. 4,4,4
- c). On what basis are they given names like Carbon-12 and Carbon- 14?  
 A. Mass number                      B. Atomic number  
 C. stability                      D. number of shells
- d). Identify the use of carbon radioactive species.  
 A. Carbon Dating                      B. Carbonation  
 C. Both are correct                      D. none is correct

(1x4)