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HANSRAJ PUBLIC SCHOOL
SECTOR-6, PANCHKULA
CLASS-IX, PAT (2025-26)
SUBJECT- SCIENCE AND TECHNOLOGY

Date- 24-01-2026 **Roll No.** 22
Time: 3 hours **Maximum Marks: 80**

General Instructions:
(i) This question paper consists of 39 questions in 3 sections. Section A is Biology (questions 1 to 16) , Section B is Chemistry (questions 17 to 29) and Section C is Physics (questions 30 to 39)

(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.

SECTION-A (BIOLOGY)

1. A cell will swell up if: (1)

(A) The concentration of water molecules in the cell is higher than the concentration of water molecules in surrounding medium.

(B) The concentration of water molecules in surrounding medium is higher than water molecules concentration 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.

2. The undefined nuclear region of prokaryotes are also known as: (1)

(A) Nucleus (B) Nucleolus (C) Nucleic acid (D) Nucleoid

3. During recess, Ritesh was having lunch with his friends. One of his friends said that the intestine helps in the digestion of food. Ritesh's sister was also present there. She asked the name of tissue which is responsible for the absorption of food. (1)

(A) Stratified squamous epithelium (B) Columnar epithelium

(C) Spindle fibers (D) Cuboidal epithelium

4. Find out the correct sentence about manure. (1)

(i) Manure contains large quantities of organic matter and small quantities of nutrients.

(ii) It increases the water holding capacity of sandy soil.

(iii) It helps in draining out of excess of water from clayey soil.

(iv) Its excessive use pollutes environment because it is made of animal excretory waste.

(A) (i) and (iii) (B) (i) and (ii) (C) (ii) and (iii) (D) (iii) and (iv)

5. Nitrogen, phosphorus and potassium are examples of: (1)

(A) Micro-nutrients and Macro-nutrients (B) Macro-nutrients

(C) Fertilizers (D) Micro-nutrients

6. A farmer in town X changed the cropping pattern of the farm. Earlier the farm had only soyabean but then the farm was divided into rows of different crops. Two rows of soyabean and alternate two rows had maize and the next two had cowpea. What would be the most likely effect of the new cropping pattern? (1)

(A) Increase in yield (B) Degradation of land

(C) Increased growth of weeds (D) Reduced intake of nutrients by crops

7. Blood is a connective tissue which has a fluid (liquid) matrix called plasma in which RBCs, WBCs and platelets are suspended. The plasma contains proteins, salts and hormones. Blood flows and transports gases, nutrients, hormones and waste materials to different parts of the body. Hemoglobin is present in which component of the blood: (1)

(A) RBCs (B) WBCs (C) platelets (D) plasma

The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

(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.

8. Assertion (A): The cells of sclerenchyma tissue are living. (d)

Reason (R): They are long and narrow as the walls are thickened due to the deposition of lignin. (1)

9. Assertion (A): Mitochondria, nucleus, and chloroplast are regarded as semi-autonomous cell organelles. (a) × (d)

Reason (R): These organelles contain their own DNA, ribosomes and replicate independently of the nucleus. (1)

10. Mention four structural differences between plant and animal cell. (2)

11. Draw a labelled diagram of a neuron. (2)

OR

Differentiate between meristematic and permanent tissue.

12. How do insect pests damage crop plants? (2)

13. Give three points of differences between prokaryotic and eukaryotic cell. 4 points (3)

14. Answer the following questions: (1+1+1)

(i) Fertilizers have short term benefits but long-term use of it is harmful. Explain.

(ii) What are the uses of fertilizers?

(iii) What is the major problem of using fertilizers in a high dose?

15. Read the following text carefully and answer the questions that follow:

Complex tissues are made of more than one type of cells. All these cells co-ordinate to perform a common function. Xylem and phloem are its example. They are both conducting tissues and constitute a vascular bundle which perform different functions in the plant.

Answer the following:

(i) Name the dead tissue component present in phloem? (1)

(ii) What is the function of phloem? (1)

(iii) (A) Write the components of Xylem Tissue. (2)

OR

(B) What are vascular tissues? (2)

16. Attempt either option A or B.

(A) Write the main function of each of the following. (5)

(i) Plasma membrane (ii) Ribosome (iii) Lysosome (iv) Nucleolus

(v) Endoplasmic reticulum

OR

(B) Describe the types of connective tissues along with their functions. (5)

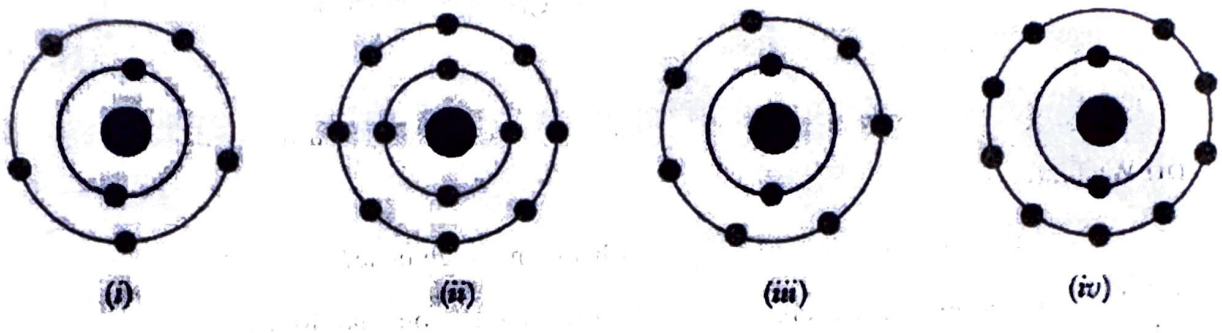
SECTION – B (CHEMISTRY)

17. The evaporation of a liquid occurs only at: (1)

(A) temperature less than 100°C (B) temperature more than 100°C

(C) all temperatures (D) fixed temperature

18. Which of the following in figures given below do not represent Bohr's model of an atom correctly? (1)



(A) (i) and (ii) (B) (ii) and (iii) (C) (ii) and (iv) (D) (i) and (iv)

19. **Assertion (A)**: The interconversion of state occurs without a change in composition but there is a change in the chemical nature of the substance.

Reason (R): During burning one substance reacts with another to undergo a chemical composition. (1)

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

20. Match the following with the correct response: (1)

(a) Carbon	(i) 2, 8, 1
(b) Sodium	(ii) 2
(c) Argon	(iii) 2, 8, 8
(d) Helium	(iv) 2, 4

(A) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii) (B) (a) - (iii), (b) - (ii), (c) - (iv), (d) - (i)

(C) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv) (D) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)

21. An element P forms an oxide with formula PO. The formulae of its sulphate and phosphate will be respectively. (1)

(A) PSO_4 and $P_2(PO_4)_3$ (B) $P_2(SO_4)_3$ and PPO_4

(C) $P(SO_4)_2$ and $P(PO_4)_2$ (D) PSO_4 and $P_3(PO_4)_2$

22. The melting points of four solid P, Q, R and S are 380K, 54K, 290K and 1600K. The forces of attraction are in order of- (1)

(A) P < Q < R < S (B) Q < R < S < P

(C) Q < R < P < S (D) R < Q < P < S

23. The particles of the colloidal solution are: (1)

(A) visible with the naked eye (B) visible with a simple microscope

(C) visible with a powerful microscope (D) not visible with a powerful microscope

24. **Assertion (A)**: An atom is very huge in size.

Reason (R): About one million atoms are stacked together to equal the thickness of a sheet of paper.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

25. Write the formulae of-

(a) Magnesium hydroxide (b) Hydrogen sulphide

(c) Barium chloride (d) Sodium carbonate (2)

26. Differentiate between a true solution and a colloid.(Write 3 points) (3)

OR

List any three points of difference between homogeneous and heterogeneous mixtures. (3)

27. Write the electronic configuration and valency of the following:

(a) Phosphorus (b) Calcium (c) Neon (3)

28. Read the following text carefully and answer the questions that follow:

Everything in this universe is made up of material "matter". The air we breathe, the food we eat, stones, clouds, stars, plants and animals, even a small drop of water or a particle of sand – everything is matter. When we make tea, coffee or lemonade, particles of one type of matter get into the spaces between particles of the other. This shows that there is enough space between particles of matter. Particles of matter are continuously moving, that is, they possess what we call kinetic energy. particles of matter have a force acting between them. This force keeps the particles together. The strength of this force of attraction varies from one kind of matter to another.

(i) Define matter? Give two examples. Three examples (1)

(ii) Which kind of matter has the largest intermolecular space between them? (1)

(iii) How can we say that solid has the strongest intermolecular force? (Any two points). (2)

OR

(iii) Explain with activity that matter has space between them? (2)

29. (A) You are given an element $^{14}X_7$. Find out

(i) Number of protons, electrons and neutrons in 'X'.

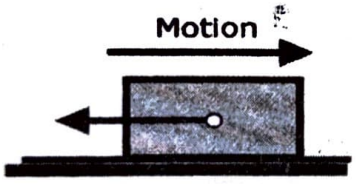
(ii) Valency of 'X'.

(iii) Electronic Configuration of 'X'.

(B) If bromine atom is available in the form of, $^{79}Br_{35}$ (49.7%) and $^{81}Br_{35}$ (50.3%). Calculate the average atomic mass of bromine. (1+1+1+2)

SECTION- C (Physics)

30. The image shows a force which always opposes the motion of one body over another body. (1)



This is:

(A) Magnetic force (B) Frictional force

(C) Gravitational force (D) Electrostatic force

31. The rate of doing work is called _____. (1)

(A) body (B) power (C) motion (D) energy

32. **Assertion (A)**: Transverse waves can be produced in liquids.

Reason (R): Light waves are transverse waves.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

33. A man throws a ball of mass 0.4 kg vertically upwards with a velocity of 10 m/s. What will be its initial momentum? What would be its momentum at the highest point of its reach? (2)

34. A person holds a bundle of hay over his head for 30 minutes and gets tired. Has he done some work or not? Justify your answer. (2)

OR

The kinetic energy of an object of mass, m moving with a velocity of 5 ms^{-1} is 25 J. What will be its kinetic energy when its velocity is doubled? What will be its kinetic energy when its velocity is increased three times?

35. (A) List any two differences between mass and weight.

(B) State Archimedes' principle (2+1)

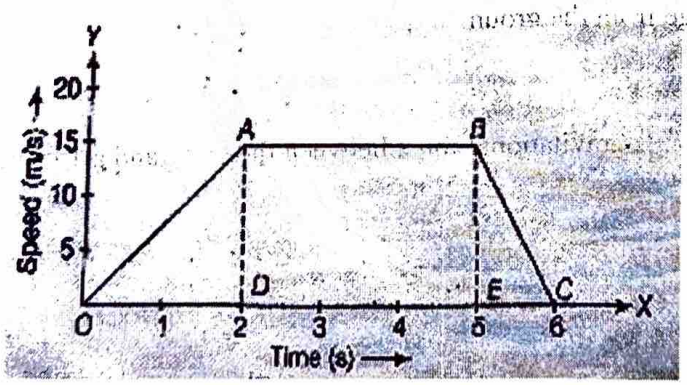
36. Kunal and Abhimanyu were waiting to go across a railway crossing. Kunal jumped over the barrier and curiously put his ear on the railway track. Abhimanyu opposed Kunal and pulled him away from the railway track.

(A) Why did Kunal put his ear on the railway track?

(B) Through which of the following sound travel faster copper or water? Justify

(C) Why did Abhimanyu pull Kunal away from the railway track? (1+1+1)

37. The speed-time graph of a car is given. (1.5+1.5)



The car weighs 1000 kg.

(A) What is the distance travelled by car in the first 2s?

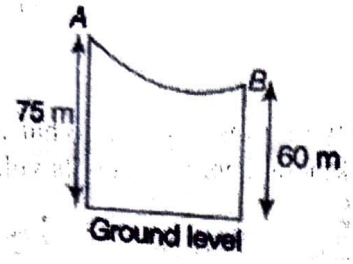
(B) What is the braking force applied at the end of 5 s to bring the car to stop within one second?

38. Work is closely related to energy. The work-energy principle states that an increase in the kinetic energy of a rigid body is caused by an equal amount of positive work done on the body by the resultant force acting on that body. (1+1+2)

(i) Define potential energy.

(ii) Give an example where potential energy is acquired by a body due to a change in its shape.

(iii) (A) A skier of mass 50 kg stands at A, at the top of a ski jump. He takes off from A for his jump to B. Calculate the change in his gravitational potential energy between A and B.



OR

(B) An object of mass, m is moving with a constant velocity, v. How much work should be done on the object in order to bring the object to rest?

39. A car falls off a ledge and drops to the ground in 0.5 s. Let $g = 10\ ms^{-2}$ (for simplifying the calculations). (1+1+1.5+1.5)

(i) What is its speed on striking the ground?

(ii) What is its average speed during the 0.5 s?

(iii) State universal law of gravitation.

(iv) (A) How high is the ledge from the ground?

OR

(B) What is the magnitude of the gravitational force between the earth and a 1 kg object on its surface? (6×10^{24} kg and radius of the earth is 6.4×10^{6} m)?