

ANNUAL EXAMINATION

SC- M2

Class 09 - Science

Time Allowed: 3 hours

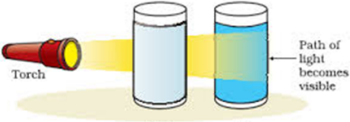
Maximum Marks: 80

General Instructions:

- i) This question paper consists of 39 questions in 5 sections.
- ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected 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 Answer type questions carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.
- v) Section - C consists of 7 Short Answer type questions carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.
- vi) Section - D consists of 3 Long Answer type questions carrying 5 marks each. Answers 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 4 marks each with sub-parts

Section A

1. Liquid A boils at 60°C while liquid B boils at 80°C which is more volatile? [1]
 - a) Liquid A
 - b) Liquid B
 - c) Neither A nor B
 - d) Both A and B
2. Which of the following factors are responsible for the change of state of solid CO_2 into vapours? [1]
 - a) Decrease in pressure
 - b) Increase in temperature
 - c) Increase in pressure
 - d) Both decrease in pressure and an increase in temperature
3. The effect shown in the image is observed through: [2]



 - a) Suspensions
 - b) None of these
 - c) Colloids
 - d) Solutions
4. A student added only two drops of iodine to a rice extract in test tube 'A'. Another student added a little rice extract to iodine solution in test tube 'B'. They would then observe: [1]
 - a) no change of colour in any test tube
 - b) a change of colour to blue-black in both tubes 'A' and 'B'

- c) a change of colour to blue-black in test tube 'B' but not in test tube 'A' d) a change of colour to blue-black in test tube 'A' but not in test tube 'B'

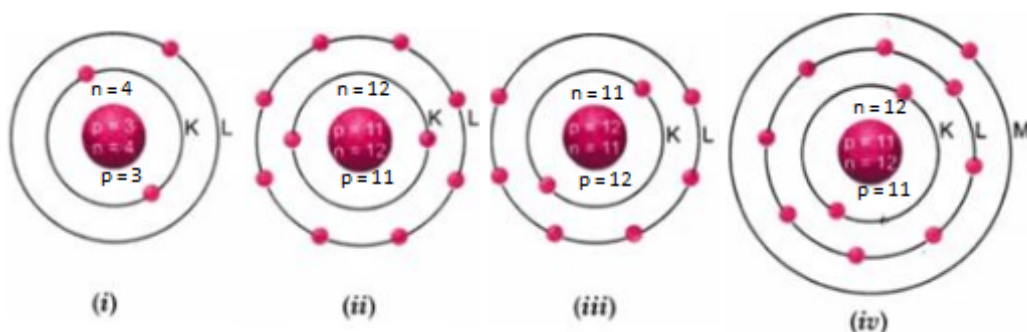
5. Which of the following statements is not true about an atom? [1]

- a) Atoms aggregate in large numbers to form the matter that we can see, feel or touch b) Atoms are always neutral in nature
c) Atoms are the basic units from which molecules and ions are formed d) Atoms are not able to exist independently

6. What is the ratio of magnesium and sulphur by mass in magnesium sulphide? [1]

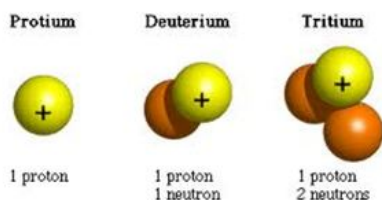
- a) 3:4 b) 23:35.5
c) 2:1 d) 5:2

7. Which of the following is Na^+ ion? [1]



- a) (ii) b) (iv)
c) (i) d) (iii)

8. The nuclei of the three isotopes of hydrogen are as follows: [1]



Which of these three isotopes of hydrogen shown above is found in nature?

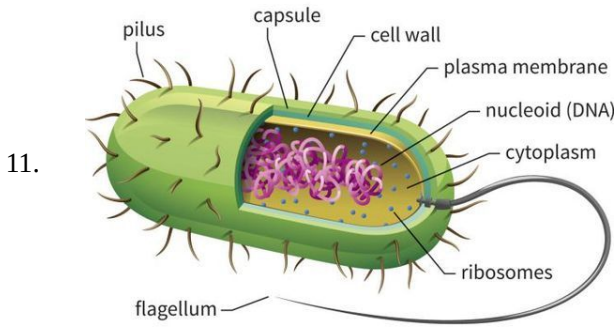
- a) Deuterium b) Protium
c) Tritium d) Protium, Deuterium and Tritium

9. Viruses do not show any characteristic of living until they enter a living cell, because of the absence of: [1]

- a) membrane b) mitochondria
c) nucleic acid d) proteins

10. A cell will swell up if [1]

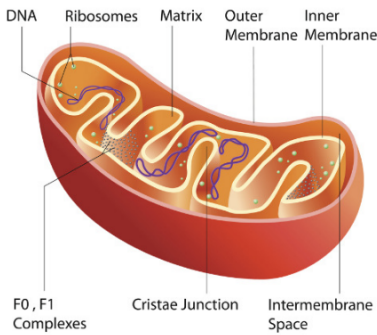
- a) The concentration of water molecules in the surrounding medium is higher than water molecules concentration in the cell. b) The concentration of water molecules is the same in the cell and in the surrounding medium.
c) The concentration of water molecules does not matter. d) The concentration of water molecules in the cell is higher than the concentration of water molecules in the surrounding medium.



Which characteristic of the nucleus in the above diagram is shown?

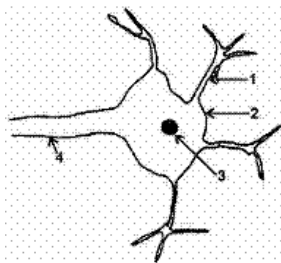
- a) Nucleoid (lacks true nucleus)
- b) True nucleus
- c) Nucleus without mitochondrial membrane
- d) nucleus with nuclear membrane

12. Mention the function of the given below cell organelle in the figure. [1]



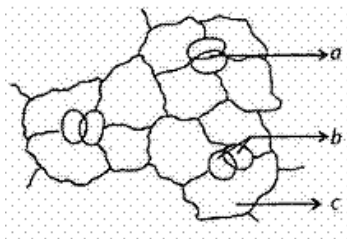
- a) Production of food
- b) It is an energy molecule
- c) It helps in cellular respiration
- d) It helps in cell division

13. The student were shown the slide of a nerve cell. They were asked to draw the diagram of the nerve cell. The correct sequence of the labeling 1, 2, 3, 4 is: [1]



- a) Axon, Cytoplasm. Dendrite, Nucleus
- b) Cilia, Nucleus, Dendrite, Cyton
- c) Axon, Nissl's granule, Dendrite, Cytoplasm
- d) Dendron, Cyton, Nucleus, Axon

14. The parts marked a, b, and c in the diagram represent, respectively [1]



- a) epidermal cell, guard cells, intercellular space
- b) stoma, guard cells, epidermal cell
- c) stoma, epidermal cells, guard cell
- d) guard cells, stoma, epidermal cell

15. While observing a stained mount of onion peel under high power compound microscope, the central part of the [1]

cell takes very little stain. This portion is known as:

- a) Cell wall
- b) Cytoplasm
- c) Nucleus
- d) Vacuole

16. A person sitting in the truck projected a ball vertically upwards. The ball: [1]

- a) falls outside the truck
- b) falls by the side of truck
- c) falls back in his hand
- d) falls in front of the truck

17. **Assertion (A):** A rocket works on the principle of conservation of linear momentum. [1]

Reason (R): For two bodies system when there is a change in momentum of one body, the same change occurs in the momentum of the second body but in the opposite direction.

- 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.

18. **Assertion (A):** Universal gravitational constant G is a scalar quantity. [1]

Reason (R): The value of G is same throughout the universe.

- 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.

19. **Assertion (A):** Transverse waves can be produced in liquids. [1]

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.

SECTION B

20. An object has moved through a distance. Can it have zero displacement? If yes, explain with an example. [2]

21. What do you mean by hypophysation? What are its advantages? [2]

22. How many atoms would be present in a black dot marked on the paper with graphite pencil as a full stop at the end of a sentence. [Given mass of a dot = 10^{-18} g] [2]

23. Why is the epidermis present as a thick waxy coating of cutin in desert plants? [2]

OR

Differentiate between voluntary and involuntary muscles. Give one example of each.

24. Which type of ribosomes are found in prokaryotes and eukaryotes? [2]

SECTION C

25. An iron ball of density 7800 kg m^{-3} and volume 200 cm^3 is totally immersed in water. [3]

- i. Calculate the weight of the iron ball in the air.
- ii. Calculate the upthrust.
- iii. Its apparent weight in water.
- iv. Its apparent density in water.

OR

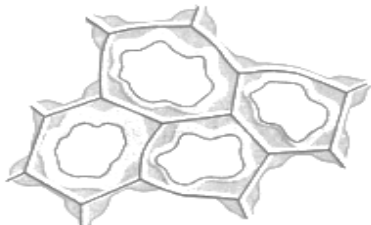
Calculate the force of gravitation between the earth and the Sun, given that the mass of the earth = $6 \times 10^{24} \text{ kg}$ and of the Sun = $2 \times 10^{30} \text{ kg}$. The average distance between the two is $1.5 \times 10^{11} \text{ m}$.

26. Observe the diagram and answer the questions [3]



Answer the following questions:

- i. What do you mean by milch animals?
 - ii. How milk production can be increased?
 - iii. Give one example of cross breed to obtain desire quality milk production?
27. [3]
- i. Identify the tissue given in the following figure.
 - ii. Mention the characteristic features of the cells.
 - iii. Specify the function of this tissue.
 - iv. Name any one part of the plant, where these cells are present.



28. A 0.24 g sample of compound of oxygen and boron was found by analysis to contain 0.096 g of boron and 0.144 g of oxygen. Calculate the percentage composition of the compound by weight. [3]
29. On the basis of the number of protons, neutrons and electrons in the samples given below identify [3]
- i. the cation.
 - ii. the pair of isobars, and
 - iii. the pair of isotopes.

Sample	Protons	Neutrons	Electrons
A	17	18	16
B	18	19	18
C	17	20	17
D	17	17	17

30. Study the given below diagram and answer the following questions: [3]



1. Identify the application of ultrasound in the above diagram.
2. Explain the working principle of this medical procedure.
3. What is the range of frequencies associated with ultrasound?

Section D

31. The transportation system of plants is composed of complex permanent tissue. They have their transportation system within themselves. Justify in detail with appropriate diagrams. [5]

OR

- i. State what will happen when human red blood cells are placed in a hypotonic salt/sugar solution.
 - ii. Why plant cell shrinks when kept in a hypertonic solution.
 - iii. Why lysosomes are known as suicidal bags?
32. In severe cold weather, a family burnt wood in the room during the night by keeping the door and windows close. After sometime, they felt suffocated. They immediately opened the windows and got relief. What did actually happen ? [5]
33. i. State the law of conservation of energy. [5]
ii. Illustrate the law of conservation of energy by discussing the energy changes which occur when we draw a pendulum bob to one side and allow it to oscillate.
34. i. A steel needle sinks in water but a steel ship floats. Explain, how? [5]
ii. Why do you prefer a broad and thick handle of your suitcase?

OR

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

- i. What is its speed on striking the ground?
- ii. What is its average speed during the 0.5 s?
- iii. How high is the ledge from the ground?

SECTION E-CASE BASED QUESTIONS

35. **Read the passage and answer any four questions:** [4]

A solution that has dissolved as much solute as it is capable of dissolving, is said to be a saturated solution. In other words, when no more solute can be dissolved in a solution at a given temperature, it is called a saturated solution. If the amount of solute contained in a solution is less than the saturation level, it is called an unsaturated solution. Chromatography is the technique used for the separation of those solutes that dissolve in the same solvent. The principle is that immiscible liquids separate out in layers depending on their densities.

Sublimation is also used to separate substance.



- i. How is the concentration of a solution is expressed ?
- ii. Write the uses of Chromatography.
- iii. Which method would you use to separate cream from milk?

36. Read the passage and answer any four questions:

[4]

ANIMAL VS PLANT CELLS



Plant Cell

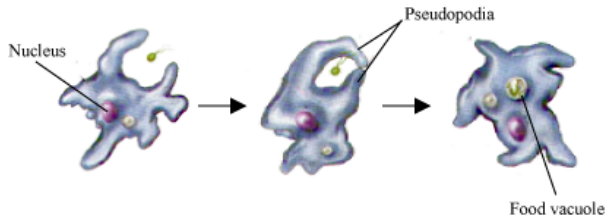


Animal Cell

The plasma membrane is the outermost covering of the cell that separates the contents of the cell from its external environment. The plasma membrane allows or permits the entry and exit of some materials in and out of the cell through osmosis and diffusion. Osmosis is the passage of water from a region of high water concentration through a selectively permeable membrane to a region of low water concentration till equilibrium is reached. If the medium has exactly the same water concentration as the cell, there will be no net movement of water across the cell membrane. Osmosis is a special case of diffusion through a selectively permeable membrane. Diffusion is important in the exchange of gases and water in the life of a cell. In addition to this, the cell also obtains nutrition from its environment.

- i. What are the components of thee plasma membrane ?
- ii. Unicellular freshwater organisms and most plant cells tend to gain water through
 - a. osmosis
 - b. diffusion
 - c. absorption
 - d. none of these
- iii. The cell will shrink in which of the following solution?
 - a. Hypotonic solution
 - b. Hypertonic solution
 - c. isotonic solution
 - d. none of these

iv. Through which process Amoeba acquire its food ?



37. **Read the following and answer the questions:**

[4]

While catching a fast-moving cricket ball, a fielder in the ground gradually pulls his hands backward with the moving ball. This is an application of the second law of motion.



1. Why the fielder lowers his hand while catching the ball?
2. What force would be needed to produce an acceleration of 4 m/s^2 in a ball of mass 6 kg ?
3. When a balloon held between the hands is pressed, its shape changes. Why?