Roll No. _____ **NLCS/09/SCIENCE/91**

Half Yearly Examination 2025 – 2026

Time - 3:00 Hrs. **M.M. 80**

Section – A

General Instructions: Read the following instructions very carefully and strictly follow them :

(i) This question paper comprises 39 questions. All questions are compulsory.

(ii) This question paper is divided into five sections Section A, B, C, D and E.

(iii) Section A Questions No. 1 to 20 are multiple choice questions. Each question carries 1 mark.

(iv) Section B Questions No. 21 to 26 are very short answer type questions. Each question carries 2 marks. Answer to these questions should be in the range of 30 to 50 words.

(v) Section C Questions No. 27 to 33 are short answer type questions. Each question carries 3 marks. Answer to these questions should in the range of 50 to 80 words.

(vi) Section D Questions No. 34 to 36 are long answer type questions. Each question carries 5 marks. Answer to these questions should be in the range of 80 to 120 words.

(vii) Section E Questions No. 37 to 39 are of 3 source-based/case-based units of assessment carrying 4 marks each with sub-parts.

(viii) There is no overall choice. However, an internal choice has been provided in some sections. Only one of the alternatives has to be attempted in such questions.

SECTION – A

Questions no. 1 to 20 are Multiple Choice Type Questions, carrying 1 mark each.

Q.1 The thing around us are composed of :

(a) carbon (b) Hydrogen (c) metal (d) matter

Q.2 Gases can be liquified by

(a) increasing pressure (b) decreasing temperature

(c) both (a) and (b) (d) decreasing pressure

Q.3 Zig-zag movement of the solute particle in a solution is known as :

(a) Linear motion (b) Circular motion (c) Brownian motion (d) Curved motion.

Q.4 The chemical symbol for Nitrogen gas is

(a) Ni (b) N_2 (c) N^+ (d) N

Q.5 The mass number of atom is equal to total number of:

(a) Protons and neutrons (b) Protons and electrons

(c) Neutrons and electrons (d) Electrons only

Q.6 Which of the following correctly represent the electronic distribution in the Mg atom?

(a) 3, 8, 1 (b) 2, 8, 2 (c) 1, 8, 3 (d) 8, 2, 2

Q.7 The number of electrons in an element X is 15 and the number of neutrons is 16. Which of the following is the correct representation of the element?

(a) ${}^{31}_{15}X$ (b)) ${}^{31}_{16}X$ (c)) ${}^{16}_{15}X$ (d) ${}^{15}_{16}X$

Q.8 The phenomena in which cytoplasm shrink in a hypertonic medium is called

(a) frontolysis (b) plasmolysis (c) Acidolysis (d) Allolysis

Q.9 Which of the following is not a cell organelle?

(a) Ribosome (b) cytoplasm (c) Golgi bodies (d) mitochondria

Q.10 Which type of cell lack a well define nucleus?

(a) prokaryotic cell (b) eukaryotic cell (c) plant cell (d) animal cell

Q.11 Which of the following is a part of phloem tissue?

(a) companion cells (b) vessels (c) tracheids (d) none of above

Q.12 A particle is moving in a circular path of radius r. The displacement after half a circle would be

(a) Zero (b) π (c) 2 r (d) 2 πr

Q.13 Inertia is that property of a body by virtue of which the body is

(a) Unable to change by itself its state of rest

(b) Unable to change by itself its state of uniform motion

(c) Unable to change by itself its direction of motion

(d) All of these

Q.14 A body is whirling a stone tied with a string in an horizontal circular path. If the string breaks, the stone

(a) Will continue to move in the circular path

(b) Will move along a straight line towards the centre of the circular path

(c) Will move along a straight line tangential to the circular path

(d) Will move along a straight line perpendicular to the circular path away from the body

Q.15 Cell wall of sclerenchyma is made up of :

(a) cellulose (b) lignin (c) Pectin (d) All of above

Q.16 What is the function of nucleus in a cell?

(a) synthesis of proteins (b) cellular respiration

(c) control of cell activities and storage of genetic material

(d) breakdown of cellular waste

For Questions number 17 to 20, two statements are given one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

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

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

Q.17 Assertion : Xylem and phloem are called vascular tissue.

Reason : Vascular tissue conduct water, minerals salt and food materials to different body parts.

Q.18 Assertion : It is easier to cook food at sea level as compared to higher altitudes.

Reason : The boiling point of water increases at high altitudes.

Q.19 Assertion : A simple tissue is made up of only one type of cells.

Reason : Various simple tissues in plants are parenchyma ,collenchyma and sclerenchyma

Q.20 **Assertion :** Every object falls towards the earth with the same acceleration.

Reason : Greater the mass of a planet, greater is the value of acceleration due to gravity on its surface.

Section – B

Questions no. 21 to 26 are very short answer type questions.

Q.21 It is a hot summer day, harsh and varshil are wearing cotton and nylon clothes respectively. Who do you think would be more comfortable and why?

OR

Why does the temperature of a substance remain constant during its melting point or boiling point?

Q.22 Joseph jogs from one end A to the other end B of a straight 300 m road in 2 minutes 30 seconds and then turns around and jogs 100 m back to point C in another 1 minute. What are Joseph's average speeds and velocities in jogging (a) from A to B and (b) from A to C?

Q.23 When a carpet is beaten with a stick, dust comes out of it. Explain?

Q.24 State the universal law of gravitation.

Q.25 Write the principles of cell theory.

OR

Draw the valuable diagram of stomata.

Q.26 Draw displacement-time graphs for the following situations:
(i) When body is stationary.(ii) When body is moving with uniform velocity.

Section – C

Questions no. 27 to 33 are short answer type questions.

Q.27 (a) Why plasma membrane is called selectively permeable membrane
(b) Name the two structures found in plant cells but not an animal cells.

Q.28 (i) Which of the following symbols of elements are incorrect? Give their correct symbols;
(a) Cobalt Co (b) Carbon C (c) Aluminium AL (d) Helium He (e) Sodium So 1½

(ii) Classify each of the following on the basis of their atomicity.
(a) F_2 (b) NO_2 (c) N_2O 1½

OR

(i) 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.

(ii) When 3.0 g of carbon is burnt in 8.00 g oxygen, 11.00 g of carbon dioxide is produced. What mass of carbon dioxide will be formed when 3.00 g of carbon is burnt in 50.00 g of oxygen? Which law of chemical combination will govern your answer? 1½+1½

Q.29 (i) Calculate the number of neutrons present in the nucleus of an element X which is represented as $^{31}_{15}X$. 1

(ii) Write down the electron distribution of chlorine atom. How many electrons are there in the L shell? (Atomic number of chlorine is 17). 1

(iii) Is it possible for the atom of an element to have one electron, one proton and no neutron. If so, name the element. 1

Q.30 Draw the well labelled diagram of the plant cell and label on it the following :
Vacuole, chloroplast, mitochondria, nucleus and Golgi bodies, lysosomes.

Q.31 Write the 1-1 function of the following tissues :
(i) Parenchyma (ii) Collenchyma (iii) Sclerenchyma

Q.32 Define 'acceleration due to gravity of earth'. Derive the expression for acceleration due to gravity?

Q.33 A truck starts from rest and rolls down a hill with a constant acceleration. It travels a distance of 400 m in 20 s. Find its acceleration. Find the force acting on it if its mass is 7 tonnes. (Hint: 1 tonne = 1000 kg)

Section – D

Questions no. 34 to 36 are long answer type questions.

Q.34 (i) Write a short note on:
(a) Law of conservation of mass (b) Law of constant proportion

(ii) State the postulates of Dalton's Theory.

OR

(i) What are polyatomic ions? Give examples.

(ii) How to calculate the molecular masses of: Cl_2, CO_2, CH_4, C_2H_6, NH_3, CH_3OH

Q.35 (a) Differentiate between xylem and phloem tissue(give the 3-3difference)

(b) Why cells of meristematic tissues lack the vacuoles?

OR

How amoeba takes its nutrition. Explain with diagram.

Q.36 (a) State second law of motion and use this law to derive the force.

(b) A player catching a moving ball moves his hand backwards. Why?

OR

(a) What is the importance of universal law of gravitation?

(b) A ball is thrown vertically upwards with a velocity of 49m/s Calculate:

(i) The maximum height to which it rises,

(ii) The total time it takes to return to the surface of the earth.

Section – E

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

Q.37 Case Study 1: The knowledge of the valencies of various radicals helps us to write the formulae of chemical compounds. The total positive charge on positive ions (cations) is equal to the total negative charge on negative ions (anions) in a molecule. Therefore, in writing the formula of a compound, the positive and negative ions are adjusted in such a way that the total number of positive charges of positive ions (cations) becomes equal to the total number of negative charges of negative ions (anions). There is another simple method for writing the formulae of ionic compounds. In this method, the valencies (or positive or negative charges) of the ions can be 'crossed over' to give subscripts. The purpose of crossing over of charges is to find the number of ions required to equalise the number of positive and negative charges.

(i) The formula of the sulphate of an element X is $X_2(SO_4)_3$. The formula of nitride of element X will be?

(ii) The formula of a compound is X_3Y. The valencies of elements X and Y will be respectively?

(iii) Write the molecular formulae of all the compounds that can be formed by the combinations of following ions Cu^{2+}, Na^{+}, Fe^{3+}, Cl^{-}, SO_4^{-2} , PO_4^{-3}

OR

Write the molecular formulae of all the compounds that can be formed by the combination of following ions Mg^{2+}, Ca^{+}, K^{+}, F^{-} , CO_3^{-2} , PO_4^{-3}

Section – E (Case Study Question)

Q.38 All living Organisms are made up of cells and these cells perform all the functions essential for the survival of the Organism eg. Respiration, digestion, excretion etc. In Unicellular organisms, a single cell carries out all these functions and in multicellular organisms different group of cells carry out different functions.

Cells were first discovered by Robert Hooke in 1665. He observed the cells in a cork slice with the help of a primitive microscope. Leeuwenhoek (1674), with the improved microscope, discovered the free living cells in pond water for the first time. It was Robert Brown in 1831 who discovered the nucleus in the cell. Purkinje in 1839 coined the term 'protoplasm' for the fluid substance of the cell.

(i) Who discovered nucleus in the cell?

(ii) Who coined the term protoplasm ?

(iii) Name the two cell organelles which are double membrane bound structure .

OR

How cell was discovered by Robert Hooke?

Q.39 **Read the cases and answer the questions that follow:**

The area under velocity-time graph gives the displacement of object. Its unit is metre(m). The velocity-time graph of particle is not a straight line. Its acceleration is variable. The displacement-time graph of an object moving with a constant speed (uniform velocity), the distance-time graph is straight line. The average speed of an object is greater or equal to the magnitude of average velocity over a given time interval. As the speed of an object, falling freely under gravity, depends only upon its height from which it is allowed to fall and not upon its mass. Since the paths are frictionless and all the objects are falling through the same vertical height, therefore, their speeds on reaching the ground must be same.

(a) What is unit of the area under a speed-time graph ?

(b) If the velocity-time graph of a particle is not a straight line. What you can say about its acceleration?

(c) If a particle moves with a constant speed, what is the shape of the distance-time graph?

OR

(c) What is the ratio of magnitudes of average speed to average velocity?

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