1. A pair of bullocks exerts a force of 140N on a plough. The field being ploughed is 15 m long. How much work is done in ploughing the length of the field ?   1

2. What will happen to the gravitational force between two bodies if the mass of one body is doubled ?   1

3. Give one difference between mass and weight.   1

Or

State Universal law of Gravitation.

4. What is uniform circular motion ?   1

5. Define potential energy.

Or

The kinetic energy of an object of mass m moving with a velocity of 5 m/s is 25J. What will be its kinetic energy when its velocity is increased 3 times?   1

6. State Newton's Second law of motion.   1

7. Plot a velocity-time graph for an object at rest.   1

8. From your understanding of the given passage, answer four out of the following five questions :

A Car of mass 1 metric ton starts from rest and accelerates to a speed of 72 kilometre per hour in 20 seconds It then moves with a constant velocity for 80 seconds, and is brought to rest in next 10 seconds.

(1 metric ton = 1000 kg)

(a) What is the force acting on the car from zero to 20 seconds ?

P. T. O.

(b) Convert 72km/h speed into metres per second.

(c) Calculate the acceleration of the car in first 20 seconds.

(d) What will be the final velocity of the car in last 10 seconds.

(e) What type of motion is executed by the car: uniform or non uniform motion ? $1 \times 4 = 4$

9   Newton gave the law of gravitation. According to this law, any two bodies of masses m1 and m2 are separated by a distance R attract each other with a force F is equal to Gm_1m_2/r^2. Here G is called universal gravitational constant. This accounts for motion of planets around the sun, motion of Moon and other artificial satellites around the earth, flow of water in rivers and so many other phenomena. Whenever an object falls towards the earth, an acceleration is involved. This acceleration is due to the earth's gravitational force and is called acceleration due to gravity (g). The unit of g is the same as that of acceleration.

Read the above passage carefully and answer four out of the following five questions :

(a) What is the value of G on the surface of Jupiter ?

(b) Give one importance of Universal law of gravitation.

(c) What do you mean by acceleration due to gravity ?

(d) Give one difference between G and g.

(e) Write down the formula of Universal law of Gravitation. $1 \times 4 = 4$

10   The molecule having atomicity 'eight' is most likely to be of :   1

(a) Chlorine   (b) Phosphorus

(c) Helium   (d) Sulphur

11   Name one non-metal which exists as liquid at room temperature.   1

12   Which subatomic particle was discovered by E. Goldstein ?   1

13   Which two of the following will show "Tyndall effect" ?

(a) Salt solution   (b) Milk

(c) Copper Sulphate solution   (d) Starch solution

Or

Identify solute and solvent in 'tincture of iodine'.

14   Read the following passage and answer any four questions from (i) to (v) :

4×1=4

The laws of chemical combination along with Dalton's Atomic Theory lay the basic foundation for the principle which decides the way in which atoms combine with each other. They are :

(a) Law of Conservation of Mass

(b) Law of Constant Proportions

Law of Conservation of Mass

The law states that, 'Mass can neither be created nor destroyed in a chemical reaction.' Antoine L. Lavoisier, a French scientist, established the theory of Law of Conservation of Mass.

According to this law, whenever matter undergoes a chemical change or physical change in an enclosed system, the total mass of reacting matter (reactants) is exactly equal to the total mass of the products of the reaction. Since none of the products or reactants are allowed to get out of the system, there is no loss of substance and mass is conserved. Hence Lovoisier called this, the law of conservation of mass.

Law of Constant Proportions

The law states that, 'In a chemical substance, the elements are always present in definite proportions by mass.'

French chemist Joseph Proust conducted several experiments and observed that component elements of certain compounds always remain in the same ratio and do not depend on the source or method preparation.

P. T. O.

For example, in ammonia NH_3, nitrogen and hydrogen are always present in a ratio of 14:3 by mass irrespective of the source from which it is obtained.

(i) Magnesium and oxygen combine in the ratio of 3:2 by mass to form magnesium oxide. What mass of Oxygen gas would be required to react completely with 24 gram of magnesium ?

　　(a) 12g　　　　(b) 6g　　　　(c) 16g　　　　(d) 10g

(ii) Calcium carbonate on heating decomposes to form calcium oxide and carbon dioxide. If 1.4g of calcium oxide is formed by complete decomposition of 2.5g calcium carbonate then the amount of carbon dioxide formed will be :

　　(a) 1.1 gram　　(b) 2.5　　　(c) 2.2g　　　　(d) 1.5g

(iii) In hydrogen peroxide H_2O_2, the proportion of hydrogen and oxygen by mass is :

　　(a) 1:8　　　　(b) 1:16　　　(c) 8:1　　　　(d) 16:1

(iv) Law of constant proportions is also known as :

　　(a) Dalton's law　　　　　　(b) Proust's law

　　(c) Lavoisier's law　　　　　(d) Avogadro's law

(v) It is best to observe the law of conservation of mass in a .... system because it will ensure that the mass is the same in the beginning and end of a chemical reaction :

　　(a) closed　　　(b) open　　　(c) balanced　　　(d) rearranged

15　For the following questions, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below

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

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

(iii) A is true but R is false.

(iv) A is false but R is true.

Assertion : When a beam of light is passed through a colloidal solution placed in a dark place the path of the beam becomes visible.

Reason : Light gets scattered by the colloidal particles.   1

16 Name the chemical substance present in cell wall.   1

Or

Define Plasmolysis.

17 Which tissue is responsible for storage in plant parts?

Or

Which tissue provides support and strength to plants?   1

18 Osmosis is the passage of water from a region of high water concentration through a semipermeable membrane to a region of low water concentration. What will happen if we put an animal cell or a plant cell into a solution of sugar or salt in water? One of the following three things could happen :

(1) If the medium surrounding the cell has a higher water concentration than the cell, meaning that the outside solution is very dilute, the cell will gain water by osmosis. Such a solution is known as a hypotonic solution. Water molecules are free to pass across the cell membrane in both directions, but more water will come into the cell than will leave. The net (overall) result is that water enters the cell. The cell is likely to swell up.

(2) If the medium has exactly the same water concentration as the cell, there will be no net movement of water across the cell membrane. Such a solution is known as an isotonic solution. Water crosses the cell membrane in both directions, but the amount going in is the same as the amount going out, so there is no overall movement of water. The cell will stay the same size.

(3) If the medium has a lower concentration of water than the cell, meaning that it is a very concentrated solution, the cell will lose water by osmosis. Such a solution is known as a hypertonic solution. Again, water crosses the cell membrane in both directions, but this time more water leaves the cell than enters it. Therefore the cell will shrink.

Thus, osmosis is a special case of diffusion through a selectively permeable membrane

Read the above paragraph and answer any four questions of the following :

(1) Define osmosis ?   1×4 = 4

(2) What is a hypertonic [hypotonic] solution ?

(3) What will happen when a [an animal] cell is kept in an hypotonic solution ?

(4) Why is osmosis a special case of diffusion?

(5) In which direction water will move if a plant cell is kept in isotonic solution ?

Reason and assertion :

Direction : In each of the following questions, a statement of Assertion is given and a corresponding statement of Reason is given just below it. Of the statements, given below, mark the correct answer as :

(a) Both assertion and reason are true and reason is the correct explanation of assertion.

(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

(c) Assertion is true but reason is false.

(d) Both Assertion and Reason are false.

19 Assertion : Parenchyma cells help in storage of food.   1

Reason : Parenchyma cells are the main seats of photosynthesis.

20 Assertion : Being able to go out to the market or to visit the neighbours is being well.

Reason : Health is therefore a state of being well enough to function well physically, mentally and socially.

Or

Assertion : All bacteria are closely related to each other.

Reason : drugs that block one of these life processes in one member of the group is likely to be effective against many other members of the group.   1

21 Why do the leaves of a tree get detached on shaking its branches ?   2

22 Distinguish between speed and velocity.   2

23 Which separation techniques will you apply for the separation of the following ?   2

(a) Oil from water

(b) Iron pins from sand

(c) Different pigments from an extract of flower petals

(d) Butter from curd.

24 What is the mass of :

(a) 2 moles of Nitrogen atoms (Atomic mass of nitrogen = 14 u) ?

(b) 0.5 mole of water molecules ?

(Atomic mass of oxygen = 16u, hydrogen = 1u)?

25   Write two differences between Areolar and Adipose tissue.   2

26   How penicillin works against bacterial diseases?   2

27   Derive the equation, $s = ut + 1/2\ at^2$.   3

28   Classify the following into elements, compounds and mixtures.   3

(a) Potassium   (b) Soil

(c) Salt solution   (d) Silver

(e) Calcium carbonate   (f) Air

29   Write the chemical formulae of the following :   3

(a) Magnesium Oxide

(b) Calcium chloride

(c) Sodium Carbonate

30   What were the three major observations Rutherford made in the gold foil experiment /α-particle scattering experiment ?   3

31   Draw labelled diagram showing animal cell.   3

32   Define each :   3

(a) Health   (b) Chronic disease

(c) Inflammation

33   Name the causal organism of each of the following :   3

(a) Tuberculosis

(b) Kala azar

(c) Jaundice

34   (i) Derive an expression for kinetic energy of an object of mass m.

(ii) Two girls, each of weight 400N climb up a rope through a height of 8m. We name one of the girls A and the other B. Girl A takes 20s while B takes 50s to accomplish this task. What is the power expended by each girl ?

Or

(i) When do we say that work is done ?

(ii) What is the relationship between the commercial unit and SI unit of energy ?

(iii) Certain force acting on a 20kg mass changes its velocity from 5 m/s to 2 m/s. Calculate the work done by the force.　　　　5

35 The given figure depicts the atomic structure of an atom of an element 'X'. Write the following information about the element 'X' :
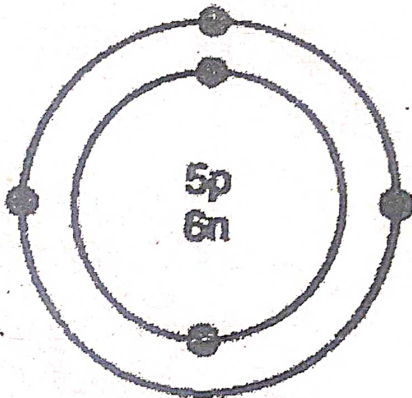
(a) Atomic number of 'X'

(b) Atomic mass of 'X'

(c) Valence electrons

(d) Valency of 'X'

(e) Name of 'X'

Or

Explain with examples :　　　　　　　　　　　　　　　5

(i) Atomic number

(ii) Isotopes and

(iii) Isobars

Give any two uses of isotopes

36 (a) Differentiate between three types of simple permanent tissues (any three points).　　　　3

(b) Write one function of each :　　　　　　　　3+2

　　(i) Schlerenchyma

　　(ii) Cartilage

Or

(a) Enlist different types of meristematic tissues. Show their locations with the help of a diagram.

(b) Write two differences between xylem and phloem.   3+2