Section-A

1. Why is evaporation called surface phenomenon ? 1
2. Find the force exerted by a ball of mass 5 kg on the Earth. 1
3. What is the location and main component of cell wall ? 1
4. What will happen when iron filings are heated with sulphur powder ? Write observations. Give two properties of the substance formed. Is it compound or mixture ? 2
5. Find the displacement of an athlete after 1 minute, if he completes one round of a circular track of radius 5 m in 30 s ? 2
6. Give one main function of mitochondria and chloroplast. 2
*7. Naphthalene balls are kept in toilets. After few days we find these balls disappear. Seema does not use flush after urination which leads to stinking of toilets. Reema always use flush after urination. 3
Answer the following questions based on the above information :
(*a*) Should we keep naphthalene balls in toilet ?
(*b*) What values are possessed by Reema who flushes after using toilets ?
(*c*) What punishment would you suggest for those who do not use flush ?
8. Distinguish between true solution and colloidal solution. Classify the following into true solution and colloidal solution.
(*i*) Milk (*ii*) Cold drink (*iii*) Blood (*iv*) Soap solution 3
9. A ball of mass 250 g is dropped from a height of 10 m. Find the velocity with which it strikes the ground. Also, find the force exerted by ball on the ground. 3
10. With the help of labelled diagram, describe an activity to show that the particles of matter are very small. Use the following materials that has been provided to you.
4 beakers, spatula, 4 test tubes, distilled water, few crystals of $KMnO_4$.
11. List the differences between mass and weight. 3
12. Find the force of attraction between a body and the Earth. If mass of a body = 5 kg, mass of the Earth = 6×10^{24} kg, radius of the Earth = 6.4×10^6 m, height of body = radius of the Earth. 3
13. Distinguish between static and dynamic friction. Why is static friction more than dynamic friction ? 3
14. Prove the relation $F = ma$ from the second law of motion. 3
15. Differentiate between striated muscles and cardiac muscles. 3
16. Draw a neat diagram of a typical plant cell and label any two organelles common in both plant and animal cells. 3
17. (*i*) Why is excess use of nitrogenous fertiliser dangerous ? 3
(*ii*) What storage losses are caused in grains due to abiotic and biotic factors ?
18. (*i*) What is the term used for the scientific management of livestock ? 3
(*ii*) What do you mean by the terms Apiary and Pasturage ?
(*iii*) Mention two desired traits for which the cross breeding of cattle is done.
19. (*a*) What is meant by crystallization ? How is impure copper sulphate purified by the process ? 3
(*b*) What is meant by fractional distillation ? How is it different from simple distillation ? 5

* Value Based Question

30. Four samples of *arhar dal* (*tuhar dal*) were taken in four test tubes with some water in each and labelled P, Q, R and S. A few drops of the following were added to these test tubes : water to test tube P, HCl to test tube Q, NaOH to test tube R and alcohol to test tube S. We would be able to confirm adulteration of the dal with metanil yellow in test tubes : 1

(*a*) P and Q (*b*) Q and R (*c*) R and S (*d*) S and P

31. A blue-black precipitate with iodine solution indicates the presence of : 1

(*a*) glucose (*b*) protein (*c*) fat (*d*) starch

32. Human cheek cells stained in methylene blue and mounted in glycerine were observed with the help of a compound microscope. The components of the cell which would be seen are : 1

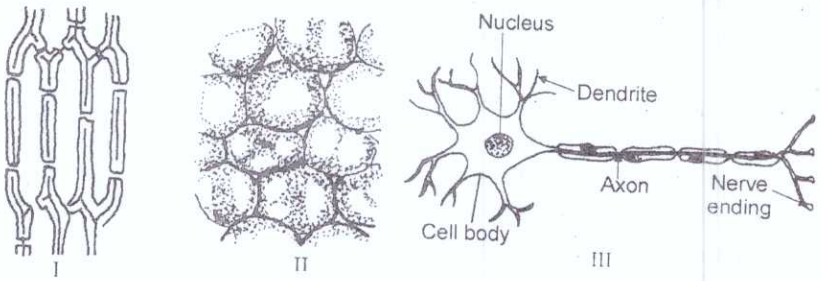
(*a*) cell wall, cytoplasm, nucleus

(*b*) plasma membrane, cytoplasm, nucleus

(*c*) plasma membrane, cytoplasm, nucleus, mitochondria

(*d*) plasma membrane, cytoplasm, nucleus, mitochondria, golgi body, lysosomes.

33. Identify the following slides in the correct order based on the feature : 1



(*a*) Sclerenchyma, Nerve cell, Parenchyma (*b*) Parenchyma, Sclerenchynra, Nerve cell

(*c*) Nerve cell, Parenchyma, Sclerenchyma (*d*) Sclerenchyma, Parenchyma, Nerve cell

34. In which category–homogenous mixture or heterogenous mixture would you place the colloids ? Give any two important characteristics of colloids. 2

35. Does the force of friction vary with

(*a*) weight of the block ?

(*b*) change in the conditions of surface in contact ?

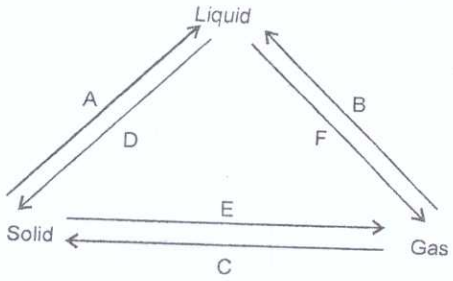
(*c*) area of contact ?

36. In an experiment, 28 g raisins were soaked in 50 ml distilled water in a beaker. After 2 hours, raisins were taken out and weighed again. If the mass of wet raisins was 32 g then compute the percentage of water imbibed by raisins. 2

20. (*a*) Why do we jerk wet clothes before spreading them on clothes wire ?

(*b*) Fruits fall off the branches of tree when a strong wind blows. Give reason.

(*c*) The following triangle exhibits interconversion of the three states of matter. Complete the triangle by labelling the arrows marked A, B, C, D, E and F. 5



21. (*a*) Why do leaves fall off a tree when branch is shaken ?

(*b*) A bicycle stops when we stop pedalling. Why ?

(*c*) When one jumps out of a boat, it is pushed backwards. Why ?

22. Relate force and impulse. A truck of mass 7000 kg moving at a speed of 90 km/h and stops in 10 s. Find the impulse. Also find force exerted on the truck. 5

23. What are macronutrients and micronutrients of crops ? How does a farmer supply these to the crops ? Mention two groups of nutrients, which are applied in the soil and differentiate them. 5

24. What are epithelial tissues ? Describe the various forms of cells of epithelial tissues. 5

Section-B

25. A mixture of soil and water was shaken well and then tested for its appearance, stability and sedimentation. The correctly reported set of observation is : 1

	Appearance	Stability	Sedimentation
(*a*)	Opaque	Unstable	Sediment
(*b*)	Opaque	Stable	Sediment
(*c*)	Transparent	Unstable	No Sediment
(*d*)	Transparent	Stable	No Sediment

26. A student set-up an apparatus for determining the boiling point of water. He records the temperature after regular intervals and finds that of water when it begins to boil : 1

(*a*) remains constant

(*b*) continuously rises

(*c*) first rises and then becomes constant

(*d*) first remains constant and then rises.

27. The observation made about a solution of common salt in water is : 1

(*a*) its components can be separated by filtration

(*b*) its particles are visible to the naked eye

(*c*) it shows Tyndall effect

(*d*) it is transparent and stable.

28. A mixture of marble powder, common salt and ammonium chloride is well shaken in water and then filtered. The residue left on the filter paper will be : 1

(*a*) common salt (*b*) ammonium chloride

(*c*) marble powder (*d*) ammonium chloride and marble powder.

29. When a mixture of marble, sodium chloride and ammonium chloride is heated in a China dish, dense white fumes are evolved. On cooling these fumes on a glass plate a white deposit is obtained. This white deposite may be : 1

(*a*) sodium chloride (*b*) marble

(*c*) sodium chloride and ammonium chloride (*d*) ammonium chloride

Section-A

1. Since molecules at the surface gain sufficient kinetic energy to change into vapours, therefore, evaporation is surface phenomenon.
2. $m = 5$ kg, $g = 9.8$ m/s^2

   $F = mg = 5 \times 9.8 = 49$ N
3. Cell wall is a rigid structure found outside the plasma membrane of the plant cell. Cellulose, a fibrous polysaccharide is the main constituent of the cell wall.
4. Black coloured solid iron(II) sulphide (FeS) will be formed. The substance formed is compound.

   Properties : (*i*) The properties of FeS are different from its constituting elements.

   (*ii*) Its components cannot be separated by physical method.
5. If athlete comes back to original position, displacement = 0

   If one round is completed in 30 s, two rounds are completed in 1 minute. So displacement = zero.
6. **Function:**

   Mitochondria is the site of cellular respiration.

   Chloroplast is the site of photosynthesis.
7. (*a*) They produce smell which overcome the smell of urine.

   (*b*) Reema has good habits and has concern for others.

   (*c*) They should be punished to clean the toilets so that others do not suffer.
8.

True solution	Colloidal solution
(*a*) It is transparent. (*b*) It is homogeneous.	(*a*) It is translucent. (*b*) It appears to be homogeneous but actually it is heterogeneous.

   (*i*) Milk is colloidal solution

   (*ii*) Cold drink is true solution

   (*iii*) Blood is colloidal solution.

   (*iv*) Soap solution is a colloidal solution.
9. $m = 250$ g $= 0.25$ kg

   $h = 10$ m; $g = 9.8$ m/s^2, $u = 0$

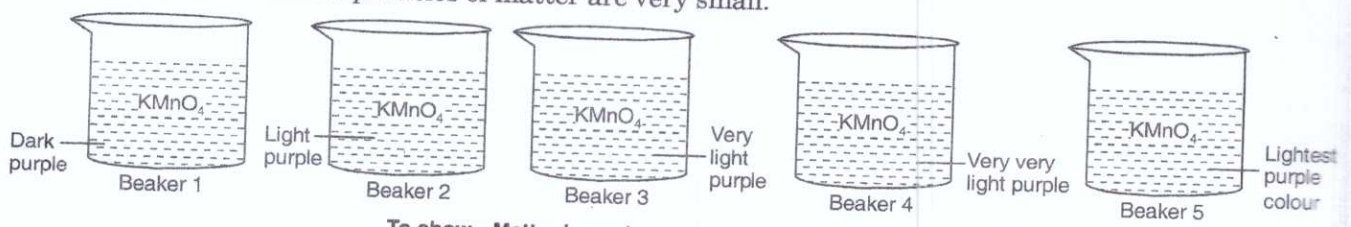
   $v = u + gh = 0 + 9.8 \times 10 = 98$ m/s

   $F = mg = 0.25 \times 9.8 = 2.450$ N
10. **Experiment :** To show particles of matter are very small.

    Procedure : 1. Take 100 ml of beaker and add 2-3 crystals of potassium permanganate.
    2. Stir it with the help of glass rod.
    3. Observe the colour of solution.
    4. Take 5 mL of above solution in a beaker and add 5 mL of water. Observe the change in colour.
    5. Take 5 mL of solution from above beaker and add 5 mL of water. Observe the change in colour and do it three times more in 3rd, 4th and 5th breaker.
    6. Observe the colour of solution in fifth test tube.

    Observations : The colour in the first beaker is dark purple which becomes light in second beaker, lighter in third, still lighter in fourth and lightest in fifth beaker.

    Conclusion : It shows particles of matter are very small.



To show—Matter is made up of very small particles

11.

Mass	Weight
(*a*) Scalar quantity	(*a*) Vector quantity
(*b*) Constant at all places	(*b*) Varies according to value of g.
(*c*) SI unit: kilogram (kg)	(*c*) SI unit : newton (N)

12. $F = \dfrac{GmM_e}{(R_e+h)^2} = \dfrac{6.67\times10^{-11}\times5\times6\times10^{24}}{(2\times6.4\times10^6)^2} = 12.21\ \text{N}$

13. The friction between two surfaces which are at rest w.r.t. each other is called static friction. The friction between two surfaces which are sliding or rolling over each other is called dynamic friction. Static friction is more than dynamic friction because in former case, surface irregularities get more easily interlocked and cause friction. When surfaces are moving relative to each other, interlocking of irregularities is difficult to occur.

14. $F \propto \dfrac{\text{Change in momentum}}{\text{Time}}$

or $F \propto \dfrac{p_2 - p_1}{t} = \dfrac{mv - mu}{t}$ (where m = mass, v = final velocity, u = intial velocity)

$F \propto m\left(\dfrac{v-u}{t}\right)$

or $F \propto ma$ (from first equation of motion)

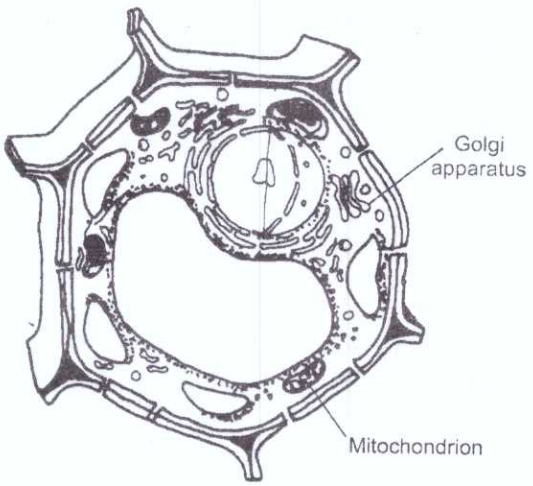
$F = kma$ (where k = constant = 1)

$\therefore$ $\boxed{F = ma}$

15. Differences :

Striated Muscles	Cardiac Muscles
(*i*) Cells of these muscles are long, cylindrical, unbranched and multinucleated.	(*i*) Cells of these muscles are cylindrical, branched and uninucleated.
(*ii*) It is arranged in bundles.	(*ii*) It is arranged as a network.
(*iii*) They are found in limbs, tongue, etc.	(*iii*) They are found in the myocardium of heart.

16.



Plant Cell

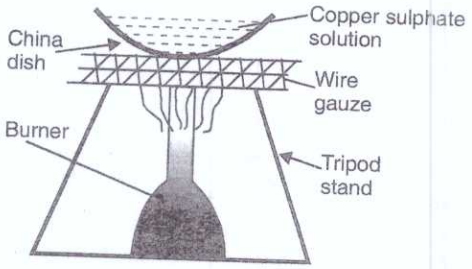
17. (*i*) Excess use of nitrogenous fertiliser is dangerous because :
(*a*) it increases growth of algae and other floating aquatic plants.
(*b*) it inhibits the growth of aquatic animals.

(ii) The storage losses of grains by biotic and abiotic factors are as follows :
(a) degradation of quality.
(b) loss in weight.
(c) *poor germinability.*
(d) poor marketability and decolouration of produce.

18. (i) Animal husbandry.
(ii) **Apiary:** For commercial production of honey, bee farms are established which are also called apiary.
Pasturage: Flowers available to the bees for nectar are called pasturage.
(iii) The two desired traits for which cross-breeding of cattle is done are :
(a) long lactation period
(b) resistance to diseases.

19. (a) **Crystallization :** It is a process in which hot saturated solution is cooled to get crystals of pure substanc
Purification of impure copper sulphate :
- Take impure copper sulphate in a beaker.
- Dissolve given copper sulphate in minimum amount of water so as to get saturated solution.
- Filter the solution if there is any suspended impurity.
- Heat the solution in china dish till crystallization point is reached.
- Cool the solution and keep it for overnight.

Result : Blue coloured crystals of pure copper sulphate will be formed.



Crystallization

(b) Fractional distillation is a process in which fractionating column is used which gives the effect of repeate distillation.
In simple distillation, miscible liquids having large difference in their boiling points are separated wherea in fractional distillation miscible liquids having less difference in boiling points can be separated.

20. (a) It helps to remove last traces of water and clothes dry up faster.
(b) It is because strong wind has lot of force and it helps in evaporation of water from a branch of tree. Whe branch dries up, fruit falls down.
(c) A is melting or fusion.
B is condensation.
C is sublimation (solidification).
D is freezing.
E is sublimation.
F is evaporation.

21. (a) Leaves have inertia of rest. When branch is shaken, it moves, but leaves tend to be at rest. So, the get detached from branch and fall down.
(b) Bicycle stops because force of friction acting in opposite direction tends to oppose its motion.
(c) By third law of inertia, when we jump out of boat, we push it backwards. Reaction force of boat pushe us forward.

22. m = 7000 kg, u = 90 km/h = 25 m/s, t = 10 s, v = 0

Impulse = $F \times t = m \times a \times t$

$$= m\left(\frac{v-u}{t}\right)t = m(v-u) = 7000(0-25) = -175000 \text{ Ns}$$

$$\text{Force} = \frac{\text{Impulse}}{\text{Time}} \; ; \quad \therefore \quad \text{Force exerted on truck} = -\frac{175000}{10} = -17{,}500 \text{ N}$$

23. (*a*) **Macronutrients :** The essential elements utilised by plants relatively in large quantities are called **major nutrients** or **macronutrients**. The six essential nutrients form the macronutrients — Nitrogen, Phosphorus, Potassium, Calcium, Magnesium and Sulphur.

Of these six macronutrients, nitrogen, phosphorus and potassium (*i.e.*, NPK) are required by plants in greater amounts and are called **primary elements** or **primary nutrients.**

(*b*) **Micronutrients :** They are the essential elements which are used by plants in small quantities or traces. The seven essential nutrients form the micronutrients. These are Iron, Manganese, Boron, Zinc, Copper, Molybdenum and Chlorine.

A farmer supplies these nutrients to the crops by the application of manures and fertilisers, *e.g.*, of manure: Decomposed cow dung and vegetables, *e.g.*, of chemical fertiliser: Urea, ammonium phosphate, NPK and sodium nitrate.

Differences:

Manure	Fertiliser
(*i*) A manure is a natural substance obtained by the decomposition of animal wastes and plant residues.	(*i*) A fertiliser is a man-made substance. It is an inorganic salt or an organic compound.
(*ii*) It contains small amounts of essential plant nutrients such as nitrogen, phosphorus and potassium.	(*ii*) It is very rich in plant nutrients such as nitrogen, phosphorus and potassium.
(*iii*) It adds great amount of organic matter in the form of humus in the soil.	(*iii*) It does not add any humus to the soil.
(*iv*) Nutrients present in the manure are absorbed slowly by the crop plants since manure is not soluble in water.	(*iv*) Being soluble in water, a fertiliser is readily absorbed by the crop plants.
(*v*) It is not nutrient specific and tends to remove general deficiency of the soil.	(*v*) It is nutrient specific and can provide specifically nitrogen, phosphorus and potassium to the soil.
(*vi*) It is voluminous and bulky, so it is inconvenient to store, transport, handle and apply to the crop.	(*vi*) It is compact and concentrated and so it is easy to store, transport and apply to the crops.
(*vii*) A manure is cheap and is prepared in rural homes or fields.	(*vii*) A fertiliser is costly and is prepared in factories.

Epithelial Tissue :

- Epithelial tissue is the simplest tissue.
- It provides a protective covering forming a continuous sheet on most organs and cavities within the body.
- The cells are closely packed and without intercellular spaces.
- It forms a barrier to keep different body systems separate.
- The skin, the lining of the mouth, the lining of blood vessels, lung alveoli and kidney tubules are all made of epithelial tissue.
- All epithelium is usually separated from the underlying tissue by an extracellular fibrous basement membrane.

Various forms of cells of epithelial tissues are as follows :

Squamous Epithelium : Simple squamous epithelium consists of extremely thin and flat cells forming a delicate lining, *e.g.*, the oesophagus and the lining of the mouth. Skin epithelial cells are arranged in many layers to prevent the wear and tear. Since they are arranged in a pattern of layers, the epithelum is called **Stratified Squamous Epithelium.**

Cuboidal Epithelium : It consists of cube-like cells with rounded nuclei, and forms the lining of kidney tubules and ducts of salivary glands, where it provides mechanical support. It also helps in absorption, excretion and secretion.

Columnar Epithelium : It consists of tall cells which are pillar-like having elongated nuclei. It is found in the inner lining of the intestine where absorption and secretion occurs. This columnar epithelium facilitates movement across the epithelial barrier.

Ciliated Epithelium : These are found in the respiratory tract.

The columnar epithelial tissue also has cilia, which are hair-like projections on the outer surfaces of epithelial cells. These cilia can move, and their movement pushes the mucus forward to clear it. This type of epithelium is thus ciliated columnar epithelium.

Glandular Epithelium : Sometimes epithelial cells acquire additional specialisation as gland cells, which can secrete substances at the epithelial surface. A portion of the epithelial tissue folds inward to form a multicellular gland called glandular epithelium.

Section-B

25. (*a*) The mixture would be opaque and unstable since it is a suspension and on sedimentation, soil will settle down due to force of gravity.

26. (*c*) The temperature first increases and then becomes constant.

27. (*d*) Salt solution is transparent and stable.

28. (*c*) Marble powder is insoluble in water, therefore, will be left as residue.

29. (*d*) Ammonium chloride will be obtained because it can sublime.

30. (*a*) Metanil yellow is soluble in water and becomes pink with HCl.

31. (*d*) Starch reacts with iodine solution to produce a substance of blue-black colour.

32. (*b*) They are the only components of the cell seen under a compound microscope.

33. (*d*) This is the correct identification.

34. Although colloids appear homogenous but actually they are heterogenous mixture.

Characteristics of colloids :

- The size of particles of a colloid is too small to be individually seen by naked eyes.
- The particles of a colloid do not settle down as sediment.

35. (a) Yes, it is directly proportional to the weight of the block under consideration.

(*b*) Yes

(*c*) No

36. Percentage of water imbibed by raisins

$$= \frac{x_2 - x_1}{x_1} \times 100$$

where x_1 = weight of dry raisins = 28 g

x_2 = weight of wet raisins = 32 g

Putting these values in formula, we get

$$\text{Percentage of water imbibed by raisins} = \frac{32-28}{28} \times 100 = \frac{4}{28} \times 100 = 14.28\%$$