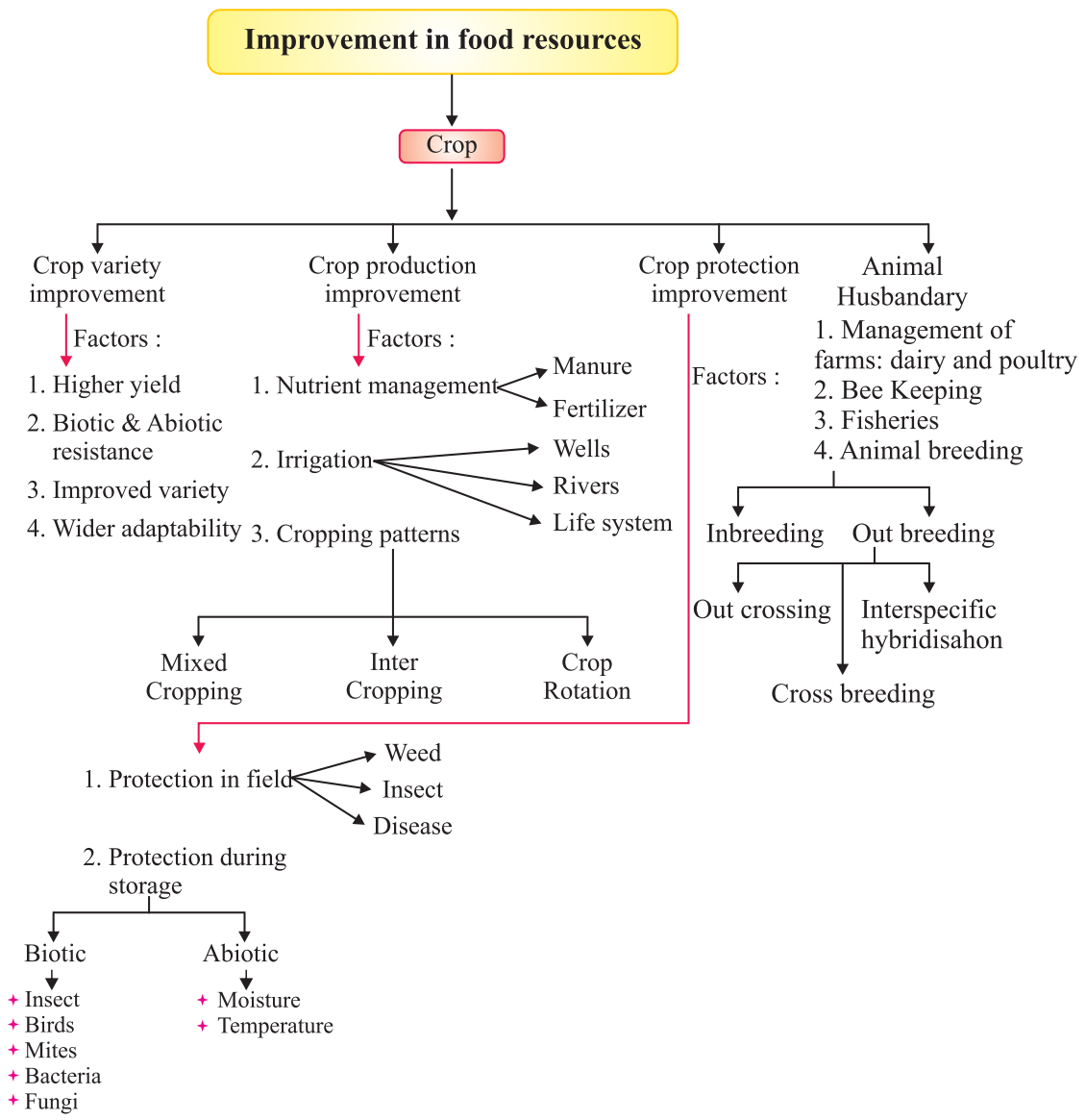
Chapter -12

Improvement In Food Resources

CONCEPT MAPPING



Green Revolution

Green revolution is a programme introduced in many countries to **increase food** production by use of modern technology, proper irrigation, improved seeds etc.

White Revolution

White revolution is a programme in India to **increase production of milk** in India. This programme made India self-sufficient in production of milk.

Types of Crops :

(a) Cereals : They include crops like wheat, rice, maize, barley etc. They provide us carbohydrates.

(b) Seeds : Not all seeds of plants are edible like seeds of apple or cherries. Edible seeds include cereals, pulses, oil seeds and nuts. They provide us fats.

(c) Pulses : They include legumes such as gram, pea, black gram, green gram, lentil. They provide us proteins.

(d) Vegetables, spices and fruits : They provide us vitamins & minerals.

They include apple, mango, cherry, banana, water-melon etc.
Vegetables like spinach, leafy vegetables, carrot etc.
Spices like chilly, black pepper, cinnamon, fennel etc.

(e) Fodder crops- They provide green fodder to the cattle eg - oats, sorghum etc.

Crop Season :

Different cops require different conditions (temperature, moisture, etc.), different photo-periods (duration of sunlight) for their growth and completing life cycle.

The two types of crops seasons are :

(a) Kharif Season : These crops grow during rainy season (June to October). They are also called summer season crops E.g. of Kharif crops are black gram, green gram, pigeon pea, rice, paddy, soyabean.

(b) Rabi Season : These crops are grown during November to April. Rabi crops are known as winter crops. E.g., wheat, gram, peas, mustard, linseed etc.

Approaches which enhance the crop yield are as following :

(i) Crop variety improvement

(ii) Crop production improvement

(iii) Crop protection improvement

(A) **Crop Variety Improvement :** Factors by which variety improvement can be done are :

- Good and healthy seeds
- Hybridization : It is the process of crossing between two or more genetically dissimilar plants to produce a new variety with good properties of both the crops.

Properties to be possessed by improved seeds
Or
Factors for which variety improvement in crops is done

(a) Higher yield : To increase the productivity of the crop per acre.

(b) Improved quality : Quality of crop products vary from crop to crop.

(c) Biotic & Abiotic resistances : Crop production reduces due to biotic and abiotic factors. Varieties resistant to these factors can improve crop production.

(d) Wider adaptability : Crops which can grow in different conditions, will help in setting high production.

(e) Desired agronomic traits : Crops which contain desired agronomic traits (height, branching, leafs), sets high production.

(B) Crop Production Improvement : It involves different practices carried out by farmers to achieve higher standards of crop production. They are :

(a) Nutrient management
(b) Irrigation
(c) Cropping patterns

(a) Nutrient Management : Like other organisms, plants also require some elements for their growth. These elements are called nutrients.

Sources	Nutrients
Air Water Soil	Carbon, oxygen Hydrogen, oxygen (i) Macro nutrients : Nitrogen – required by plants in large amount, phosphorus, potassium, calcium, magnesium, sulphure.
	(ii) Micro nutrients : Iron, Mn – required in small amount, boron, Zn, copper, molybdenum, chlorine.

Manure and Fertilizers

To increase the yield, the soil can be enriched by supplying nutrients in the form of manure and fertilizers.

Manure :

- It is a source of organic matter.
- It supplies small quantities of nutrients to the soil.
- It is prepared by the decomposition of animal excreta and plant waste.

Various forms of Manures :

(A) Compost : The process in which animal excreta (like cow dung), kitchen waste, plant remains, waste food, sewage waste etc. are decomposed in pits is known as composting.

(B) Vermicompost : Compost prepared by using earthworms to hasten the process of decomposition of plants and animals refuse is called vermicompost. Here, an earthworm is physically aerator, crusher and mixer, chemically a degrader and biologically a stimulator of decomposition.

(C) Green manure : Some plants like sunn hemp, guar etc. are grown and after sometime mulched by ploughing in the field. These green plants turn into green manures. They are rich in nitrogen and phosphorus.

Fertilizers :

Fertilizers are prepared in factories. They are made up of chemical substances. They have large amount of nutrients like **Nitrogen, Phosphorus and Potassium. (NPK)** Fertilizers are easily absorbed by the plants since they are soluble in water. It is costly.

Difference between Manures and Fertilizers

Manures	Fertilizers
1. These are organic substances.	1. These are inorganic substances.
2. These are made up of natural substances (decomposition of plant and animal waste).	2. These are made of chemical substances.
3. These have less amount of nutrient.	3. These have large amount of nutrients.
4. These are cheap and are prepared in rural homes or fields.	4. These are costly and are prepared in factories.
5. Manures are slowly absorbed by the plants since they are insoluble in water.	5. Fertilizers are easily absorbed by the plants since they are soluble in water.
6. It is difficult to store and transport.	6. Their storage and transportation is easy.

(b) Irrigation : The process of supplying water to the crop plants is called irrigation.

Methods of Irrigation :

(i) **Wells :** These are of two types :

Dug wells : In dug wells, water is collected by bullock-operated devices or by pumps.

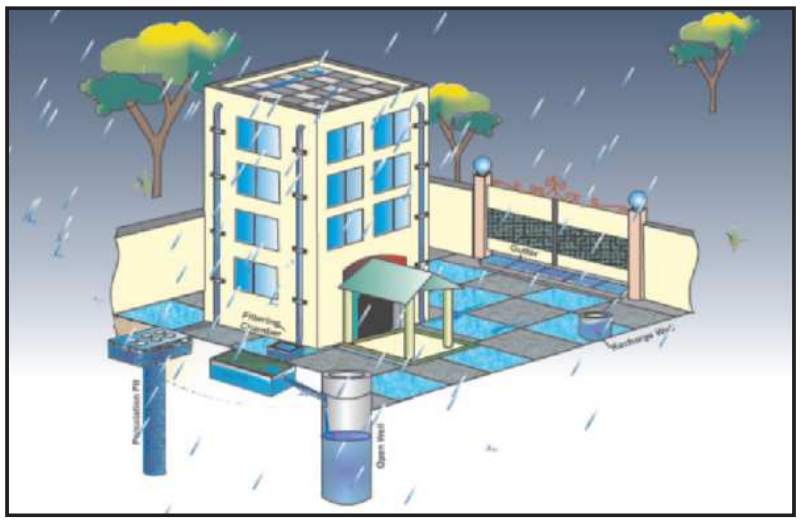
Tube wells : It makes very deep underground water available for irrigation. Motor pump is used to lift water.

(ii) **Canals :** These get water from large rivers.

(iii) **River lift system :** In this system, water is directly taken from rivers through pumps. This system is useful for irrigation in areas close to river.

(iv) **Tanks :** These are small storage reservoirs.

(v) **Rain water harvesting :** Rain water harvesting is a accumulation of water in tanks for later use. This also prevents soil erosion.



(c) Crop Patterns : Different patterns are used to maximize the production from crop field. They are :

(i) Mixed cropping

(ii) Inter cropping

(iii) Crop rotation

(i) Mixed cropping : Growing two or more than two crops together on the same piece of land is called mixed cropping. ***E.g.,*** **wheat and gram, wheat and mustard, groundnut and sunflower.** This is generally done to minimize the risk of total crop faliure due to abnormal weather conditions. Fertility is also seen to be increased.

(ii) Inter cropping : Two or more crops are grown on the same field in a definite pattern. Few rows of one followed by few rows of the other. ***E.g.,*** **Soyabean + maize, pearl millet (Bajra) + Cow pea (lobia)**. It makes better use of natural resources of sunlight, land and water end also arrest soil erosion effectively

(iii) Crop rotation : Crop rotation is policy of growing different crops one after another on the same field.

- If some crop is grown again and again on the same field, same nutrients are extracted from soil again and again. So we should choose different crops so that all nutrients of soil are used.
- **Advantages :**
  - (1) Soil fertility is maintained.
  - (2) It controls pests and weeds.
  - (3) Several crops can be grown in succession with only one soil preparation.

(d) Crop Protection Improvement

To protect crops against diseases causing organisms and other harming factors is called crop protection. Following methods are used to control these problems :

(a) Pest control during growth

(b) Storage of grains

(a) Pest control during growth : Pest is any destructive organism which can destroy or harm crops or products obtained from them. Pests are of many types :

(i) **Weeds :** Unwanted plants in the cultivated field *e.g.,* xanthium.

(ii) **Insects :** Insects can harm plants in following ways :

- They cut the root, stem and leaf.
- They suck the cell sap from various parts of the plant.

(iii) **Pathogens :** Organisms such as **bacteria, fungi and viruses** which cause diseases in plants are called pathogens. They are transmitted through air, water, soil.

(b) **Storage of grains :** For getting seasonal foods throughout the year, they are stored in safe storage. But during storage of grains, they can be destroyed and wasted by various means.

(i) **Biotic Factors :** Due to living organisms like insects, birds, mites, bacteria, fungi.

(ii) **Abiotic Factors :** Due to non-living factors such as moisture, inappropriate temperature etc.

These factors affect quality in form of degradation, loss in weight, change in colour, poor germinability.

Organic Farming

Using fertilizers and pesticides has its own disadvantages. They cause pollution, damage soil fertility in long run. Grains, fruits, vegetables obtained may contain harmful chemical in small amount.

Organic farming is a farming system with no or very little use of chemicals like fertilizers and pesticides.

Different ways to protect food grains before they are stored for future use :

(a) **Drying :** The food grains should be properly dried in the sun.

(b) **Maintenance of hygiene :** The grains must not contain insects. The godowns should be cleaned well. The cracks in the roof and on the walls and floor should be sealed completely.

(c) **Fumigation :** Godowns and stores should be properly sprayed with fumigants. Specially, the seeds should be treated with insecticides and fungicides.

(d) **Storage devices :** Cleaned and dried grains should be stored in gunny bags or other proper bags. Airtight, moisture-resistant and temperature-resistant storage devices have been developed by various organizations. These should be used.

ANIMAL HUSBANDRY

Animal husbandry is a scientific management of domestic animals in an efficient manner to obtain food and other useful products from them.

Cattle farming : Purpose of cattle farming is :

(a) For getting milk

(b) Ploughing fields

(c) Bull cart for transportation

Types of cattle :

- Cow (Bos indicus)
- Buffalo (Bubalus)

Milch animals : These includes milk producing animals (female cattle).

Draught animals : Those animals which do not produce milk and are used for agricultural work.

Lactation period : The period of milk production between birth of a young one and the next pregnancy is called lactation period.

Care of Cattle

(1) Cleanliness

- Roofed shelter with good ventilation for protection from rain, heat and cold.
- Regular brushing of skin of cattle.
- Sloping floor for shelter for avoiding water-logging.

(2) Food

- Roughage mainly containing fibre
- Concentrates containing proteins
- Food containing micronutrients (vitamins and minerals) for enhanced milk production

Diseases : Diseases can cause death and reduce milk production.

- Parasites are small organisms living inside or outside the body of another organism (host). They derive food from the body of host.
- External parasites on skin of cattle cause skin diseases.
- Internal parasites like worms cause stomach and intestine problems and

flukes cause liver problems.

- Bacteria, virus cause infectious diseases (diseases that can be easily transmitted from one to another).

Poultry Farming : Poultry farming is done for eggs and meat. They both provide protein to our diet.


Broilers : Birds grown for obtaining meat are called broilers. They can be used after 6-8 weeks from their birth.

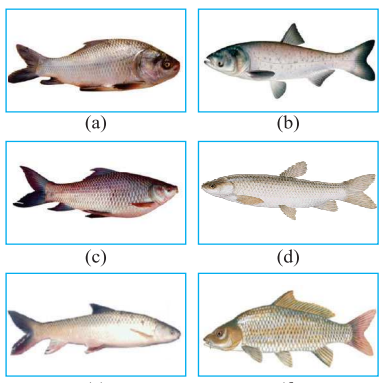
Layers : Birds grown for obtaining eggs are called layers. They can be used after 20 weeks when sexual maturity has been attempted to lay eggs.

Most of the broilers and layers are cross-bred.

Breeding is done to enhance following properties in hens :

- More and better quality chicks.
- Low maintenance.
- Breeding is done to produce dwarf broilers (meat-giving birds). Feeding cost is the biggest expense in poultry farms. Dwarf broilers need less food and can reduce cost by 30%. Also, they can tolerate more heat.

Fish Production :


(a) (b) (c) (d) (e) (f)

(a) Catla (b) Silver carp (c) Rohu (d) Grass carp (e) Mrigal (f) Common carp

Fish production is a great source of protein to our diet.

Fish production is of two types :

(1) **Fin fish production/True fish production :** Production and management of cartilaginous and bony fishes such as **pomphret, tuna, cod, catla, prawns, rohu** etc.

(2) **Shell fish production :** Production of shell-fish such as **prawns, mollusks.**

Depending on the mode of obtaining fishes, fishing are of two types :

(1) **Capture fishing :** Naturally living fishes in various water bodies are captured.

(2) **Culture fishing :** Fishes of desired variety are cultivated in confined areas with utmost care to get maximum yield. This is also called aquaculture. Aquaculture can be done in oceans, rivers, lakes, ponds etc. When it is done in oceans, it is called mariculture.

Marine fishing : Marine fishing includes fish production in ponds, rivers, reservoirs.

- Popular marine fishes includes Pomphret,Tuna,Sardines, Bombay duck. Some costly fishes found in sea like nullets, prawns, seaweed, oysters.
- Using satellites, regions of high fish population in sea can be found. Echo-sounders are also used.

Inland fishing : It includes fish production in fresh water (for example ponds, rivers, lakes, reservoirs) and brackish water (for example estuaries).

Composite Fish Culture : A fish culture system where 5 to 6 varieties of fish are reared in a single fish pond.

- They are selected so that they do not compete for food. They should have different food requirements.

Example :

Catla : **Feeds in the upper part of water.**

Rohu : **Feeds in middle part of water.**

Mrigals, common carps : **Feeds at bottom.**

- **Advantage :** More yield.

  Problems : Many fishes lay eggs during monsoons only, due to which number of fishes will not grow fast. So hormonal stimulation is used. Using this fishes can be made to reproduce any time.

Apiculture Bee-keeping : It is the practice of keeping, caring & management of honeybees on a large scale for obtaining **honey and wax.**

Many farmers use bee-keeping for additional small income. Also, there are big farms called apiaries/bee farms.

Apiary : The setting up of a number of bee hives in desirable location in a systematic manner that allows maximum pollen and nectar collection.

- Some common **Indian varieties of bees** include ***Apis carana indica*** **(Indian bee),** ***Apis dorsata*** **(rock bee),** ***Apis flora*** **(little bee).**
- One **Italian variety** ***Apis mellifera*** is also used in India for commercial large scale production because of its following advantage :
  (a) High honey collection capacity.
  (b) They reproduce fast.
  (c) They sting less.
  (d) They stay in a bee hive for long.

Honey : It is a dense sweet liquid.

- It is used in medicines. It is used as sugar.
- It is used as a source of energy.

Pasturage : Pasturage is the availability of flowers to the bees for nectar and pollen collection.

Or, Pasturage of flora is the type of crop, flower or other plants from which bee collects nectar and pollens to produce honey.

It affects the quality and quantity of honey because different flora produce nectar and pollen of different types *e.g.,* almond honey of Kashmir is very tasty.

QUESTIONS

VERY SHORT ANSWER

1. Why do we need food ?
2. Name some cereals which provide us carbohydrate.
3. What is kharif season? Name a few kharif crops.
4. What is manure? How is it prepared?
5. What is hybridization?
6. What is the main sources of irrigation in India?
7. What do you mean by mixed cropping.

SHORT ANSWER

1. What are pathogens? How are they transmitted?
2. Write the differences between manures and fertilizers.
3. What are the differences between broilers and layers.
4. Write the advantages of inter-cropping and crop-rotation.
5. What are the benefits of cattle farming ?

LONG ANSWER

1. (*a*) What are the ways to protect food grains before they are stored for future use?
   (*b*) Write advantages of bee keeping.
2. What is composite fish culture? What is the main problem associated with this practice? What is the criteria of choosing fish for this type of culture.
3. What factors may be responsible for losses of grains during storage?
4. What are macro nutrients? From were the plants get it.
   Or
   Draw the diagram of Inter cropping.
5. Why should our food contain cereals, pulses, fruits and vegetables?

OBJECTIVE TYPE QUESTIONS.

I Match the following :

	Column I		Column II
a.	Micronutrient	p.	Soyabean
b.	Kharif crop.	q.	Bee
c.	Rabi crop.	r.	Wheat
d.	Apis mellifera	s.	Molybedinum

2. Manure and fertilisers are the main source of _____ supply to plants.
3. Growing two or more crops in definite row pattern is known as _____

II MCQ.

(i) The best way to increase the yield of wheat in India is

a. To sow seeds of improved varities.
b. To use tractors
c. To reduce the quantity of ration consumers.
d. To remove weeds from the wheat fields.

(ii) Birds specially grown for meat only is known as _____

a. Hybrid. b. Broiler. c. bird management.
d. Bird culture

(iii) The drones in honey bee are

a. Sterile male. b. fertile males.
c. Sterile female. d. fertile female.

(iv) Potato tuber wash and Iodine solution placed together change their colour to _____

a. Blue-Black. b. Blue.
c. Brick-red. d. Magenta.

(iv) Metanil yellow causes _____

a. Stomach ulcer. b. Diarrhoea.
c. Cancer. d. Paralysis.

Assertion and Reasoning Type Questions

Direction : In the following questions, a statement of assertion (A) in followed by a statement of Reason (R). Mark the correct choice as

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

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

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Q1. Assertion (A) Vermicomposting is an important method of preparing compost,

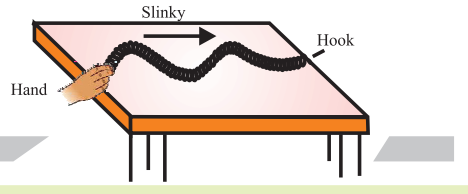
Reason (R) : An earthworn is physically an aerator, crusher and mixer, chemically a degrader and biologically a stimulator of decomposition.

Ans. (a) The degradation of organic waste through the consumption by the earthworms is called vermi composting.

Q2. Assertion (A) - The basic objective in mixed cropping is to minimise the risk and insurance against the total crop failure.

Reason (R) - Wheat and chicken pea are examples of inter cropping.

Ans. (b) Both the assertion and reason are true but here, the reason is not the correct explanation of assertion, the mixed cropping is done to minimise the risk and insurance against the crop failure due to abnormal weather conditions and wheat and chick-pea in an example for the same.



Experiment

List of Practical

Experiment No. 1 : Preparation of

(a) A true solution of common salt, sugar and alum.

(b) A suspension of soil, chalk powder and fine sand in water.

(c) A colloidal solution of starch in water and egg albumin/milk in water and distinction between these on the basis of

- Transparency
- Filtration criterion
- Stability

Experiment No. 2 : Preparation of

(a) Mixture

(b) A compound

Using Iron filing and Sulphur powder and distinction between these on the basis of :

(i) Appearance, *i.e.,* homegeneity and heterogeneity

(ii) Behaviour towards a magnet

(iii) Behaviour towards carbon disulphide as a solvent

(iv) Effect of heat

Experiment No. 3 : Performing the following reactions and classifying them as physical or chemical changes :

(a) Iron with Copper Sulphate solution in water

(b) Burning of magnesium ribbon in air

(c) Zinc with dilute Sulphuric Acid

(d) Heating of Copper Sulphate Crystals

(e) Sodium Sulphate with Barium chloride in the form of their solutions in water

Experiment No. 4 : Preparation of stained temporary mounts of

(a) onion peel,

(b) Human Cheek Cells & to record observations and draw their labeled diagrams.

Experiment No. 5 : Identification of Parenchyma, Collenchyma and Sclerenchyma tissues in plants striped, smooth and cardiac muscle fibers and nerve cells in animals from prepared slides. Drawing of their labeled diagrams.

Experiment No. 6 : Determination of the melting point of ice and the boiling point of water.

Experiment No.7 : Verification of Law of reflection of sound.

Experiment No. 8 : Determine the density of solid (denser than water) by using a spring balance and measuring cylinder.

Experiment No. 9 : Establishing the relation between the loss in weight of a solid when fully immersed in

(a) tap water

(b) Strongly salty water, with the weight of water displaced by it by taking at least two different solids.

Experiment No.10 : Determination of the speed of a pulse propagated through a stretched string/slinky.

Experiment No. 11 : Verification of Law of Conservation of mass in a chemical reaction.

EXPERIMENT NO. 1

Aim : To prepare :

(a) a true solution of common salt, sugar and alum

(b) a suspension of soil, chalk powder and fine sand in water

(c) a colloidal solution of starch in water and egg albumin water and to distinguish between these on the basis of

(i) filtration (ii) transparency (iii) stability

Apparatus required : Take hard glass test tubes, test tube stand, a China dish, a glass rod, a tripod stand, funnels, filter paper, torch or flash light.

Materials (Chemicals) required : Common salt, sugar, alum, chalk powder, garden soil, egg albumin, fine sand and distilled water.

Procedure :

(*a*) To prepare true solutions of dry common salt, sugar and alum

Take three test tubes (A, B, C). Pour 10 cc of distilled water in each test tube. Take a pinch of salt and put it in 'A' test tube and shake it vigorously after closing the mouth of test tube. The common salt dissolves completely to form true solution. Do the same procedure with sugar and alum powder and put them in test tubes labelled 'B' and 'C'. The result is also same. They all (salt, sugar and alum) form true solutions with water.

(b) To prepare suspensions of soil, chalk powder and fine sand in water

Take three test tubes (D, E, F). Pour 10 cc of distilled water in each test tube and pour a pinch of chalk powder in 'D' test tube. Shake it vigorously after closing the mouth of test tube. The chalk powder does not dissolve completely and forms a suspension. Do the same procedure with garden soil and sand (fine sand) in test tubes labelled 'E' and 'F' respectively. The result is also same. All three materials form suspension.

(c) To prepare colloidal solutions of starch in water and egg albumin in water

(i) To prepare a colloidal solution of starch in water Take about 1 gm of starch in a China dish. Pour about 20 cc of distilled water in a China dish. Stir the contents with a glass tube till a milky suspension is formed. Heat the 50 cc of water to the boiling point on a Bunsen flame, by placing it on the tripod stand. Stir the contents of the China dish continuously

and pour it in boiling water. Allow the contents to cool. The product so formed is colloidal solution of starch in water in test tube ‘G’.

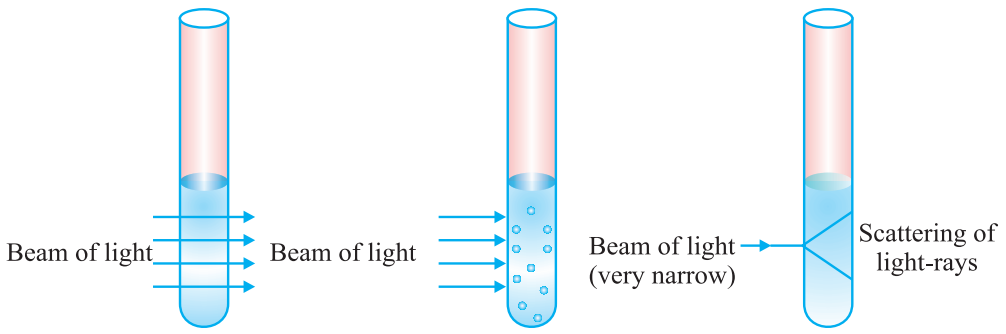
(ii) To prepare a colloidal solution of egg albumin in water

Take about ½ cc of egg albumin in a test tube. Pour about 10 cc of distilled water in the test tube. Shake the contents of the test tube vigorously for 1 minute and the albumin gets suspended to form turbid (light milky) product. The product so formed is the colloidal solution of egg albumin in water.

To distinguish a true solution, a suspension and a colloid on the basis of (a) transparency, (b) filtration (c) stability.

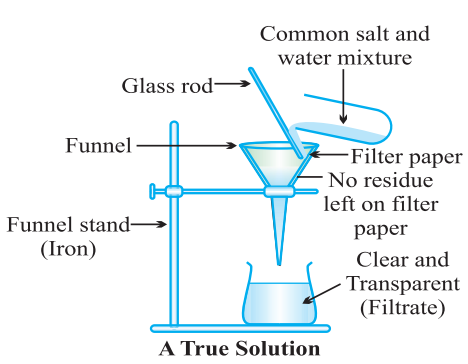
Again take test tube ‘A’, test tube ‘D’ and test tube ‘G’ which are true solution of salt suspension of chalk powder and colloidal solution of starch respectively. Now pass laser light through it to see the transparency. Now filter them all through filter paper and also check their stability in test tubes by allowing its contents to stand for 5 minutes.

(a) Transparency

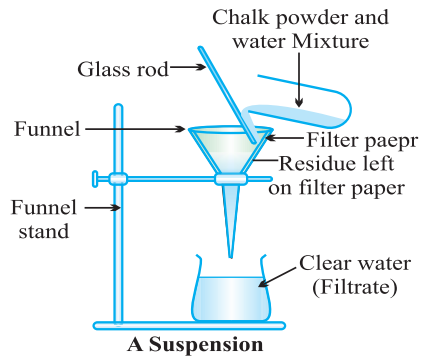


To distinguish a true solution, a suspension and a colloid on the basis of transperancy

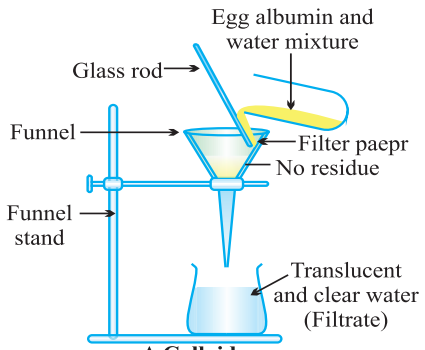
(b) Filtration criterion



A True Solution



A Suspension



A Colloid

(c) *Stability :* Let the three tubes A, D and G be allowed to stand for 5 minutes.

Observations

	Transparency	Filtration	Stability
Test tube 'A' : True solution of common salt, sugar, alum	The light rays passes through it.	The contents passes through filter paper leaving no residue. The filtrate is clear and transparent.	No sediments settle down and the solution remains clear.
Test tube 'D' : Suspension of chalk powder	Light rays scatter through contents.	The contents leave residue of chalk powder on the filter paper. The filtrate is clear.	The sediments settle down and clear water collects above it.
Test tube 'G' : Colloidal solution of starch	Light rays scatter through contents.	The content passes through filter paper leaving no residue on the filter paper and filtrate is translucent.	No sediment settles down and there is no change in its consistency.

Result :

(a) True solutions are transparent, stable, homogenous and they can pass through filter paper leaving no residue on the filter paper. They do not scatter light

(b) Suspensions are opaque, leave residue on the filter paper. They are unstable. They scatter light.

(c) Colloids are translucent, leaves no residue on the filter paper and the filtrate is translucent. They are stable and scatter light.

Precautions :

(a) The test tubes should be neat and clean.

(b) Wastage of chemicals should be avoided.

(c) Mix the contents carefully and stir it thoroughly while preparing various types of mixtures.

(d) Do not taste any material.

EXPERIMENT NO. 2

Aim : To prepare (a) a mixture, (b) a compound

Using iron filings and sulphur powder and distinguish between these on the basis of :

(a) appearance i.e., homogeneity and heterogeneity

(b) behaviour towards a magnet

(c) behavior towards carbon disulphide

(d) effect of heat

Theory :

Compound : A pure substance which is composed of two or more elements, combined chemically in a fixed ratio, such that they can be broken into elements only by chemical means is called a compound.

Mixture : When two or more substances (elements, compounds or both) are mixed together in any proportion do not undergo any change but retain their individual properties, the resulting mass is called a mixture.

Material required : A hard glass test tube, a test tube holder, mortar and pestle, two watch glasses, a hand lens, a magnet, a rack full of clean test tubes, Bunsen burner or spirit lamp.

Procedure :

(*a*) Preparation of a mixture of iron and sulphur

Take 7 g of iron filings and 4 g of sulphur and put them in a mortar. Grind the constituents with pestle thoroughly. The product so obtained is a mixture of iron and sulphur. Divide the mixture into two halves and place them in two watch glasses.

(*b*) Preparation of the compound of iron and sulphur (Iron sulphide)

Transfer the mixture of one of the watch glasses to a hard glass test tube. Now hold the test tube in the test tube holder. Heat the mixture strongly on a burner till its contents start glowing with a reddish glow. Stop heating now. Iron reacts with sulphur to form its compound iron sulphide with the release of heat energy. Again transfer the iron sulphide in watch glass.

Observation :

Experiment	Observation	Inference/Result
1. Action with magnet : Roll a bar magnet in the mixture as well as in the compound.	Iron particles cling to the magnet in case of the mixture, but not in case of the compound.	Constituents of a mixture can be separated by physical means, but not that of a compound.
2. Observation under magnifying glass : Observe the mixture as well as the compound under a magnifying glass by spreading them thinly on a paper.	In case of the mixture, grey particles of iron and yellow particles of sulphur can be seen clearly and they are not uniform throughout. Black mass of homogeneous substance can be seen in case of the compound.	Mixtures are heterogenous in nature, but compounds are homogenous in nature.
3. Action with carbon disulphide : Place a small amount of the mixture and compound in separate test tubes and add 5 cc of carbon di-sulphide. Shake well.	In case of the mixture, yellow particles of sulphur dissolve and grey particles of iron settle down. In case of the compound, nothing dissolves.	Constituents of a mixture can be separated by physical means, but not that of a compound.
4. Effect of heat : Heat the small amount of mixture and compound separately in two test tubes.	In mixture, sulphur & iron melts to form compound iron sulphide. In compound, no change.	Mixture shows chemical reactions. Compound do not show chemical reaction.

Precautions :

(a) Heat the mixture of iron and sulphur in the hard glass test tube only.
(b) While performing various experiments use minimum amount of the mixture or compound.
(c) Carbon disulphide is inflammable, keep it away from flame.

Practical Based Questions

1. What happens when iron filing and sulphur powder are mixed together in a china dish. Write your observation, what do you find in the mixture (Physical nature)

2. If you rotate a magnet into the mixture of iron filings and sulphur powder, which substance would stick to magnet and why?

3. If the mixture of iron filings and sulphur powder are heated for sometime and then magnet is rolled over the compound, write your observation with reason.

4. If you put some amount of the mixture of iron filings and sulphur into carbon disulphide solution, do you find anything dissolving into carbon disulphide. Name the substance.

5. You are given two test tubes 'A' and 'B' with carbon disulphide solution into them. In test tube 'A' you put a mixture of iron filings and sulphur while in test tube 'B' you put iron sulphide compound. What do you observe in both the test tubes respectively? Write your answer with reason.

6. A student used a test tube for heating a mixture of iron filings and sulphur powder. What suggestion do we give to the student to perform this experiment correctly ?

EXPERIMENT NO. 3

Aim : To carry out the following chemical reactions and classify them as physical or chemical changes :

(a) Iron nail and copper sulphate solution in water

(b) Burning of magnesium ribbon in air

(c) Zinc with dilute sulphuric acid

(d) Heating of copper sulphate

(e) Sodium sulphate with barium chloride in the form of their solutions in water

Materials required : Test tube stand, tongs, spirit lamp, iron nail, copper sulphate solution, 10 cm long magnesium ribbon, small piece of granulated zinc, dilute sulphuric acid, sodium sulphate solution, barium chloride solution.

Theory :

Physical change : When there is no change in the composition of a substance and no change in chemical nature of the substance.

Chemical change : It is a change which brings change in the chemical properties of matter and a new substance is obtained.

Procedure :

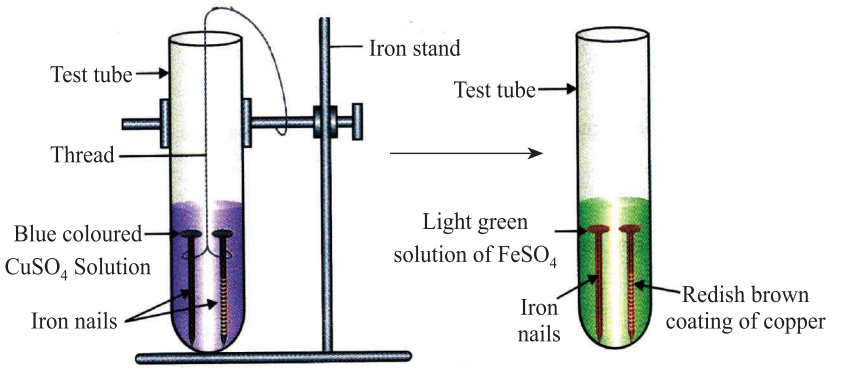
(a) Experiment with iron nail and copper sulphate solution

Pour about 10 ml of copper sulphate solution in the test tube. Place/Put a clear iron nail in the solution and observe after 15 to 30 minutes Observations recorded are given below :

(i) Copper sulphate is blue in colour. On placing nail (iron) in it for 15 minutes or more the colour changes from blue to light blue after 30 minutes finely slightly greenish after 24 hr.

(ii) Iron nail gets coated with reddish/brownish deposit of copper metal.

$$Fe\ (s) + Cu^{2+}SO_4^{2-}\ (aq) \rightarrow Fe^{2+}SO_4^{2-}\ (aq) + Cu\ (s)$$



When iron nails are kept in $CuSO_4$ solution

Inferencce : (i) Chemical change

(ii) Iron displaces copper from $CuSO_4$ because Iron is more reactive than copper.

(b) Experiment with burning magnesium ribbon in air

Hold one end of a 10 cm long magnesium ribbon with tong and burn it in air on spirit lamp.

Observation : The magnesium ribbon burns with a dazzling white flame to form a white powdery mass. This white powdery mass continues dropping from the magnesium ribbon.

$2Mg + O_2 \xrightarrow{\Delta} 2MgO + heat$

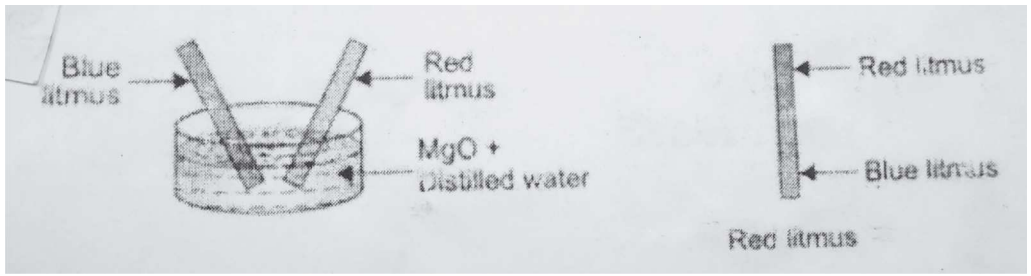
$MgO + H_2O \quad Mg(OH)_2$

[It turns red litmus to blue being basic in nature]

Inference : (i) Chemical change (ii) MgO is basic in nature

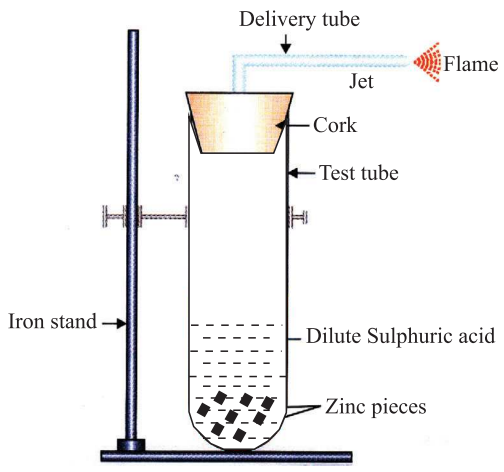
(c) Experiment with zinc and dilute sulphuric acid

Introduce a small piece of granulated zinc in a clean test tube. Pour about 5 ml of dilute sulphuric acid in the test tube.



Observation : The zinc metal briskly reacts with dilute sulphuric acid. From the surface of zinc, a large number of tiny bubbles of a gas rise. The contents of the test tube get hot. The colourless gas evolved is hydrogen, which explodes with a pop sound when burning matchstick brings to the mouth of test tube.

$$Zn + H_2SO_4 \text{ (dil.)} \rightarrow ZnSO_4 + H_2 \text{ (g)}$$



H_2 gas is produced, when zinc reacts with dil. H_2SO_4 which burns with a pop sound

Inferencce : (i) Chemical change
(ii) H_2 gas is released which burns with pop sound.

(d) Experiment with copper sulphate on heating

Heat 2 g of blue coloured copper sulphate in a tube on Bunsen flame for about 2 to 5 minutes. After 5 minutes cool the test tube now add 2 to 3 drop of water in the test tube.

Observations :

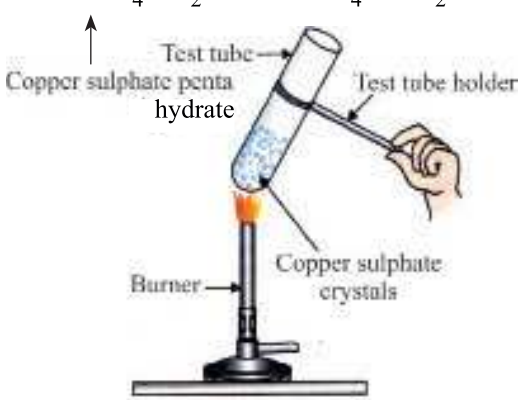
(i) Blue coloured copper sulphate crystals crumbled to form white powdery mass.

(ii) Large amount of steamy fumes are given out.

(iii) These fumes condense on the cooler part of the test tube.

(iv) If few drops of water are added again to white powdery mass, it regains its blue colour.

$$CuSO_4.5H_2O \rightarrow CuSO_4 + 5H_2O$$



Heating of copper sulphate crystals

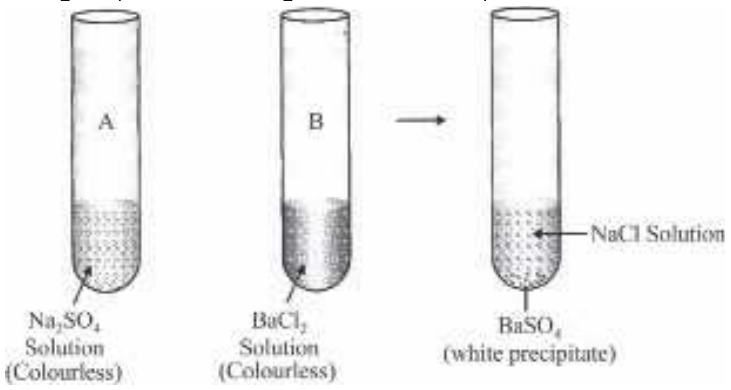
Inferencce : (i) Physical change.
(ii) $CuSO_4.5H_2O$ looses water and becomes anhydrous and on adding water, it again becomes blue in colour.

(e) Experiment with sodium sulphate and barium chloride solutions

Pour about 5 ml of sodium sulphate in a clean test tube and into this add 5 ml of barium chloride solution. Shake the contents of the test tube.

Observations : A white precipitate is formed, which gradually settles at the base of the test tube because insoluble barium sulphate is formed.

$$Na_2SO_4\ (aq) + BaCl_2\ (aq) \rightarrow BaSO_4\ (s) + 2NaCl\ (aq)$$



White precipitate of $BaSO_4$ gets formed when Na_2SO_4 solution and $BaCl_2$ solution react with each other

Precautions:

(a) Test tubes should be clean and dry.
(b) Use minimum amount of chemicals.
(c) Always hold the test tube with a test tube holder before heating.
(d) Use fire tongs for holding magnesium ribbon.

Practical Based Questions

1. What is the colour of copper sulphate penta hydrate and copper sulphate (Anhydrous) ?

2. What happens if you mix/react sodium sulphate and barium chloride solution.

3. Why copper sulphate changes its colour on heating ?

4. Ram has placed iron nail in a test tube containing copper sulphate. After 30 minutes he observed that colour of copper sulphate faded and a material got deposited on the iron–

(a) What will be the colour of the solution if Ram forgets the nail in the test tube ?

(b) Name the material which get deposited on nail.

5. Why is it needed to clean the Magnesium ribbon with sand paper before burning?

6. (a) What happens when Zinc granules are added to dil Sulphuric acid?

(b) Which gas will be released and how will you check it?

EXPERIMENT NO. 4 (a)

Aim : To prepare stained temporary mount of onion peel and to record observations and draw a labelled diagram.

Materials required : microscope, onion, knife, needles, forceps, slide, cover slip, brush, methylene blue stain, Safranin stain, glycerine, glass slide, blotting paper, water etc.

Theory : Onion peel is made up of many rectangular cells. These are plant cells. Each cell has a rigid cell wall made of cellulose. Plant cell has plastids and a large central vacuole.

Procedure :

(a) Take a thin onion scale from an onion.

(b) Break it from the concave side to get a transparent and thin piece of membranous onion peel.

(c) Now keep this piece of onion peel in a watch glass containing water.

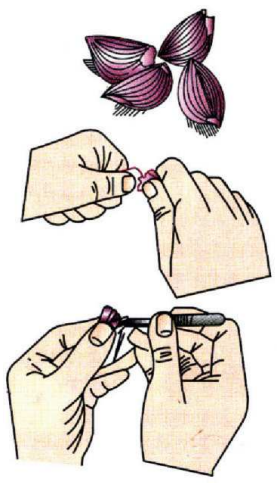
(d) Cut out a small portion of this peel and place it on a glass slide and add a drop of methylene blue solution for a few seconds.

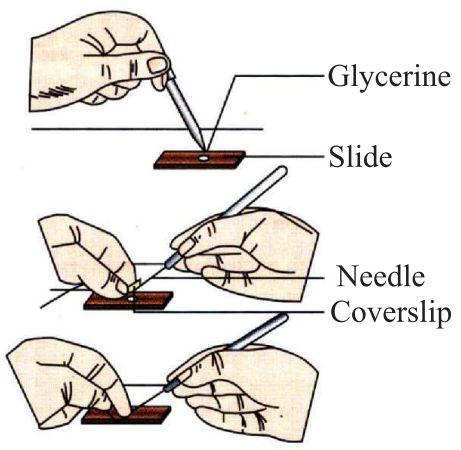
(e) Drain out the stain and mount the onion peel on a drop of glycerine.

(f) Cover the peel gently with cover slip with the help of Needle to avoid the entry of air bubbles.

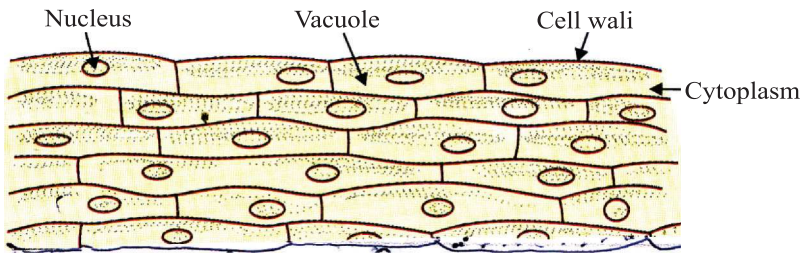
(g) Gently press the cover slip with a needle so as to spread the glycerine evenly.

(h) Remove excess glycerine from the edges of the cover slip using a blotting paper.





Under low powerof the Microscope (slide of onion peel)



Observations :

(a) There are large number of brick shaped (rectangular) cells lying side by side in a membrane.

(b) A distinct darkly stained nucleus is present in each cell.

(c) A prominent vacuole is seen in the centre and cytoplasm is present on inner surface of cell wall.

Precautions :

(a) Always hold the slide from its edges.

(b) Do not put excessive stain on slide.

(c) Put the cover slip at 45° angle to avoid the entry of air bubble.

(d) Soak excessive water or glycerine on slide with blotting paper.

EXPERIMENT NO. 4 (b)

Aim : To prepare stained temporary mount of human cheek cells and to record observations and draw their labelled diagrams.

Materials required : Watch glass, clean glass slide, cover slip, needles, brush, toothpick, methylene blue solution, blotting paper, high powered microscope.

Theory : Human cheek cells are animal cells. They are without cell wall and have denser cytoplasm. Animal cells do not have large vacuoles. They don't have plastids.

Procedure :

(a) Take a clear glass slide and in the middle of it pour a drop of distilled water with the help of a dropper.

(b) Take a clean toothpick and use it to scrap the inner wall of cheek gently, so as to scrap the epithelial tissue.

(c) Mix the scrap on the toothpick in the drop of water placed on the glass slide.

(d) Pour a drop of methylene blue solution on the mixture on the slide and mix it thoroughly.

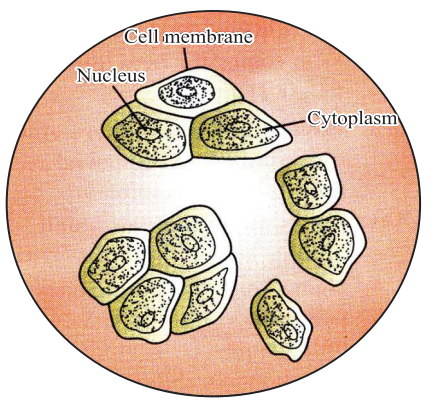
(e) After 2-3 minutes remove the excess water and methylene blue solution evenly on the slide by using tip of a blotting paper.

(f) Put a drop of glycerine on the contents of slide and spread it.

(g) Take a dry and clean cover slip and hold it from its edges with left hand. Place the cover slip on the slide in such a way that one of its edges comes in contact with the mounting material *i.e.,* glycerine. Now put the cover slip without air bubble.

(h) Remove the extra material surrounding the covership with the help of blotting (filter) paper.

(i) Examine the slide under high power microscope.



Slide of cheek cells under microscope

Observations :

(a) Large number of flat cells with irregular boundaries are seen.

(b) Each cell has a thin cell membrane (or plasma membrane).

(c) A distinct deeply stained nucleus is seen in each cell.

(d) There are no intercellular spaces between the cells.

(e) No cell wall is visible.

(f) Space between the plasma membrane and the nucleus is filled with granular material called cytoplasm

Inference : The examination of material on the slide suggests that it is an animal cell, because cell wall and prominent vacuoles are not seen.

Precautions :

(a) Scrapping of the cheek cells should be done very carefully so that no damage is done.

(b) The toothpick should be washed thoroughly so that it does not infect the cheek with any foreign bodies.

(c) The slide should be neatly made with no air bubbles and in just the right amount of glycerine used.

(d) Overstaining and understaining should be avoided.

(e) Mounting should be done in the middle of slide.

Practical Based Questions

1. Why do we use glycerine while preparing the temporary slide?
2. Which stains are used to stain cheek cell and onion peel?
3. What precautions must be taken while preparing the temporary slide?
4. Write the steps to prepare a temporary slide of onion peel.
5. Draw a diagram of onion peel that you observed under microscope.
6. What precautions must be taken while preparing the temporary slide of cheek cell?
7. Draw the diagram of cheek cell that you observed under microsocope.

EXPERIMENT NO. 5

Aim : To identify parenchyma and sclerenchyma tissues in plants striped muscle fibres and nerve cells in animals from prepared slides and to draw their labelled diagrams.

Materials required : Prepared slides of parenchyma tissues, sclerenchymatous tissues, striped muscle fibres, nerve cells and compound microscope.

Theory :

Tissue : A tissue is a group of similar cells having a common origin and held together by intercellular substances to perform a particular function.

Permanent tissues : Some tissues loose their capacity to divide, so they are called permanent tissues. For example, parenchyma, sclerenchyma in plants and striped muscle fibres and nerve cells in animals.

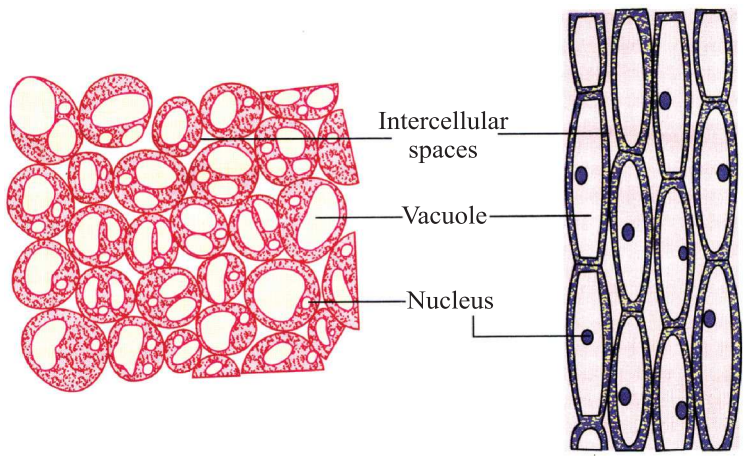
Procedure :

(a) Take a prepared slide and observe it under microscope.

(b) Study the slide and write its identifying features. Also, draw diagrams in your notebook what you see under observation.

Observation :

(a) Parenchyma



Features :

(a) The cells are isodiametric *i.e.,* almost equal in length and width.

(b) There are intercellular spaces at the corners for the exchange of gases.

(c) The cells have thin walls.

(d) There is a large central vacuole in each cell.

(e) A distinct nucleus is present in peripheral cytoplasm.

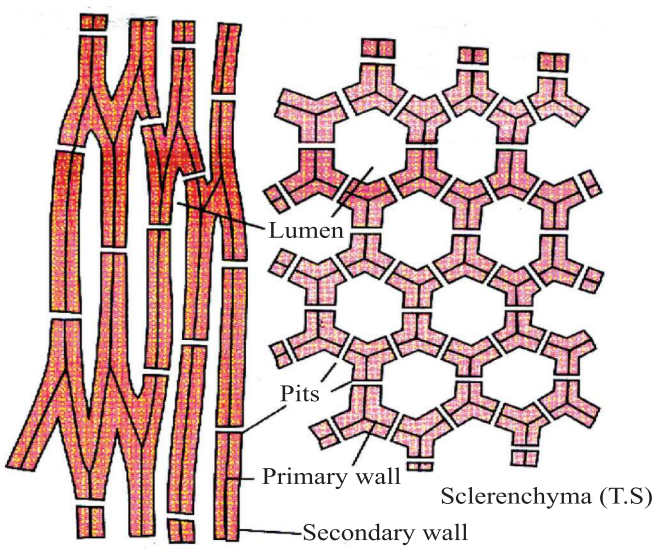
Inference :

(a) Parenchyma tissue is located in soft parts of the stem, leaves, roots, fruits, flowers.

(b) They act as packaging material, sometimes photosynthesis also occurs.

Observation :

(b) Sclerenchyma



Features :

(a) Sclerenchymatous cells are dead cells.

(b) They have evenly thickened hard cell walls.

(c) They have very little or no protoplasm.

(d) They have hard lignified secondary walls.

(e) They can be divided into two types :

(i) Fibres : They are elongated cells with tapering ends.

(ii) Sclereids : These are irregular isodiametric cells.

Inference :

This tissue is very widely distributed tissue and occurs in form of distinct or patches and forms the chief constituents of hard parts of the plant. These cells, being thick walled and having deposition of lignin give mechanical strength to the plant.

Observation :

(c) Striated muscles or voluntary muscles or striped muscle fibres

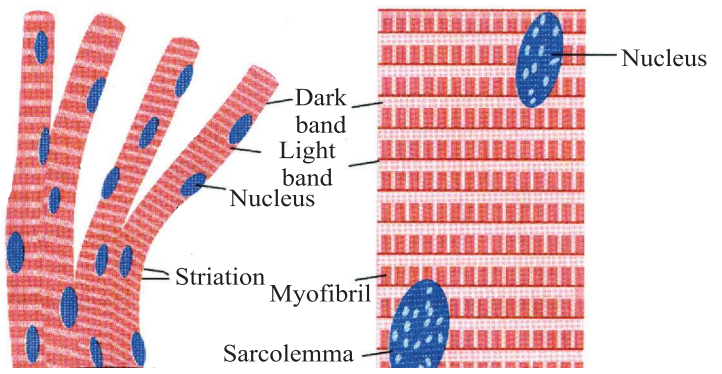


Diagram showing striated muscle fibres or striped muscle fibres

Features :

(a) The fibres are long, cylindrical and unbranched.

(b) The cells are surrounded by connective tissue.

(c) The muscle fibres are multinucleated.

(d) The nuclei lie towards the periphery of the fibres.

(e) The cells of this muscle are non-tapering.

(f) Dark and light band appear alternately giving the characteristic striped or striated appearance.

Inference :

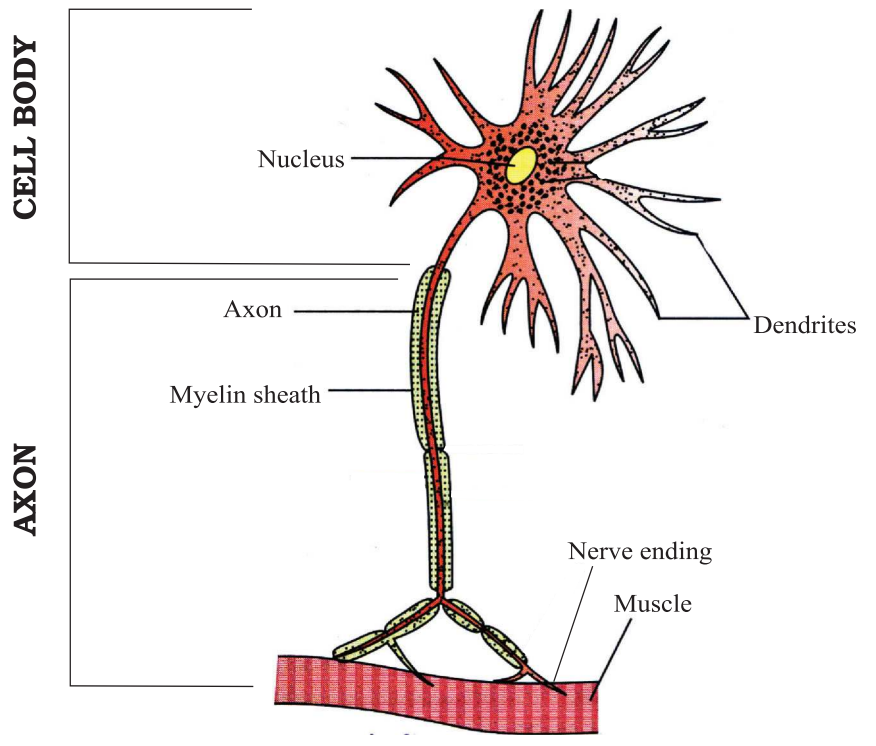
(a) Striped muscle fibres are found attached to the bones in different parts of the body.

(b) These bring about skeletal movements.

(c) They help in locomotion and maintaining the posture of the body.

Observation :

(d) Nerve tissues :



Features :

(a) The nerve cell has a larger body called cyton.

(b) The cell body (cyton) has a prominent nucleus.

(c) Cyton has cytoplasmic projections called dendrites.

(d) A group of axons held together by a connective tissue is called a nerve.

(e) The axons are covered with medulary sheath or myelin sheath.

(f) The nerve endings are attached to muscles.

Inference :

Nerve cell has a large cell body with prominent nucleus such that cyton has cytoplasmic projections called dendrites and one a long one, called axon.

Practical Based Questions

1. What are identifying features of

(a) Parenchyma (b) Collenchyma

(c) Sclerenchyma

2. Draw diagram of striated muscle that you observed in the slide.

3. Draw a neat labelled diagram of a neuron.

4. What is the difference between striated and smooth muscle?

5. Differentiate between Parenchyma, Collenchyma and Sclerenchyma.

6. Draw a neat labelled diagram of Parenchyma Tissue.

7. Which tissue has cells that are having lignified thickened walls?

EXPERIMENT NO. 6

Aim : To determine the melting point of ice and the boiling point of water.

Materials required : A glass beaker (200 cc), a wire gauze, a tripod stand, a Celsius thermometer, a glass rod, an iron stand, a Bunsen burner or a spirit lamp, a magnifying glass, distilled water, ice cubes prepared from distilled water.

Theory : When a solid is heated then kinetic energy of the molecules is large enough to overcome the binding forces and the substance changes its state.

Melting point of the solid : The constant temperature, at which a solid changes completely to its liquid state at a constant pressure of 1 atmosphere, is called the melting point of the solid.

Boiling point of the liquid (water) : The constant temperature, at which a liquid changes completely to its vapour (gaseous) state at a constant pressure is called boiling point of the liquid.

Procedure :

(a) Melting point of the solid

(i) Take a beaker and put the small ice pieces (crushed ice) into it (about 100 g- 150 g).

(ii) Insert a stirrer into the ice kept in the beaker.

(iii) Place the beaker containing ice on the tripod stand with a wire gauze.

(iv) Suspend a thermometer vertically in the ice by using an iron stand.

(v) Note the temperature of ice before lighting the burner.

(vi) Heat the ice pieces. Stir well while heating.

(vii) Record the temperature when the ice melts completely.

(b) Boiling point of the water

(i) Take about 50 ml of distilled water in a hard glass test tube.

(ii) Put 2-3 small pieces of pumice stone to avoid bumping.

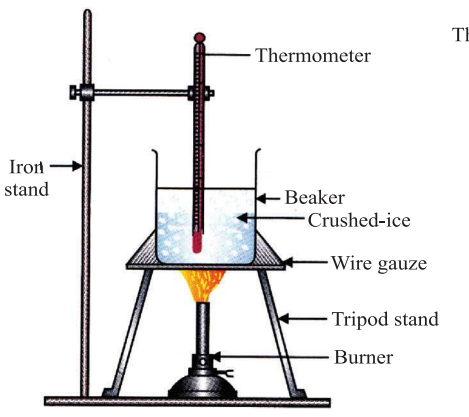
(iii) Fix a cork with bores in the mouth of the test tube and fix it in an iron stand.

(iv) Fix a thermometer in one of the bores and a delivery tube in the other bore.

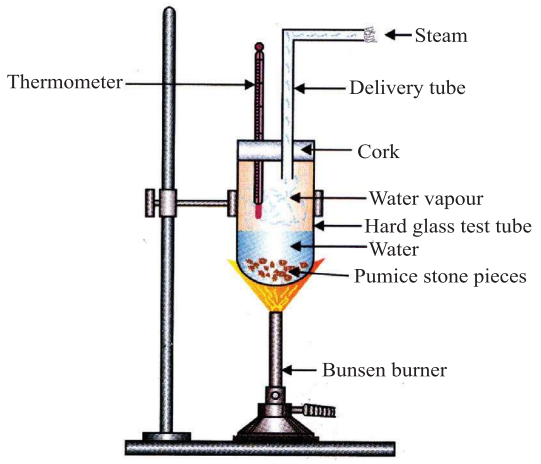
(v) Heat the boiling tube gently. Keep on moving the flame as otherwise the tube is likely to break.

(vi) Note the temperature when the boiling of water starts. Continue heating of water till the temperature becomes constant and the water starts boiling.

(vii) Note the constant temperature also.



To determine the boiling point of water



To determine the boiling point of water

Observation :

Boiling Point of water			Melting point of ice		
S. No.	**Time in minutes**	**Boiling point of Water in °C**	**S. No.**	**Time in minutes**	**Melting point of ice in °C**
1.	0	.....	**1.**	0	.....
2.	1	.....	**2.**	1	.....
3.	2	.....	**3.**	2	.....
4.	3	.....	**4.**	3	.....
5.	4	.....	**5.**	4	.....

Result :

(a) Boiling point of water is .....°C.

(b) The boiling point does not change with time as long as any water is left for boiling.

(c) Melting point of ice is .....ºC.

(d) The melting point of ice does not change with time as long as ice is present in the mixture of ice and water formed from it.

Precautions :

(a) Use a good quality thermometer.

(b) Do not record the temperature in half or quarter degrees as the accuracy of the thermometer is 1 ºC.

(c) Record the boiling point or the freezing point only when the mercury thread is stable at one place for 2 minutes or more.

(d) Do not immerse the stem of the thermometer in water or ice. This leads to expansion or contraction of the stem which results in recording of wrong temperature.

Practical Based Questions

1. List the steps to determine the melting point of ice.

2. List the steps to determine the boiling point of water.

3. Why do we use distilled water to determine the boiling point of water?

4. A student put 2-3 pieces of pumice stone in water to determine the boiling point of water. Why does he do so?

5. When on heating, water starts converting itself into vapours (steam), the temperature remains constant. Why?

EXPERIMENT NO. 7

Aim : *To verify laws of reflection of sound.*

Material required : Chart paper, glass sheet/cardboard sheet, watch, gum, table, chalk pieces.

Theory : Sound follows laws of reflection like light. These laws are :

(a) Incident angle formed by sound wave, reflection angle are equal to each other.

$$\angle i = \angle r$$

(b) Incident sound ray, reflected sound ray and normal at the point of incidence, all lie in the same plane.

Procedure :

(i) Make 2 pipes of 30 cm each and equal diameters from chart paper.

(ii) Put a cardboard/glass sheet between 2 chart pipes or rollers as shown in picture 1.

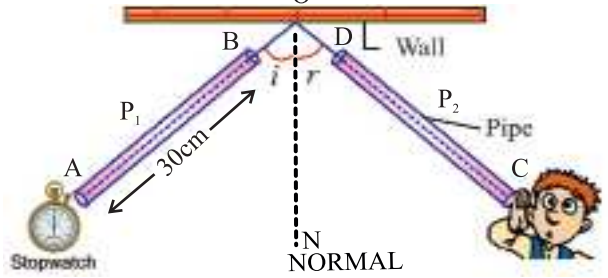
(iii) Put a clock in front of pipe P_1.

(iv) Now adjust pipe P_2 at different angles and find when do you hear the maximum sound.

(v) Now mark 2 points each at both the pipes A, B and C, D to mark their positions.

(vi) Remove the pipes and make lines making angle of incidence (between AO and ON) and reflection angle (CO and ON) and make their values in the following table $\angle AON = \angle i$, $\angle CON = \angle r$.

O



Observations :

S. No.	Angle of incidence, $\angle i$	Angle of reflection, $\angle r$	$\angle i - \angle r$
1.			
2.			
3.			
4.			

Result/Conclusion :

(a) Angle of incidence is equal to angle of reflection of sound.

(b) Incident ray, reflected ray, normal at the point of incidence, all lie in the same plane.

Precautions & sources of error :

(i) Don't change the position of pipe P_1 until you are able to hear the maximum sound from P_2.

(ii) Keep watch very close to P_1.

(iii) Glass or cardboard should be of such size that you don't hear the direct sound from watch.

(iv) Table should not move at all.

(v) Both pipes should be of equal lengths and diameters.

Practical Based Questions

1. Write the steps of verification of reflection of sound.

2. Draw a diagram showing reflection of sound and find relationship between $\angle i$ and $\angle r$.

3. A student is performing experiment to verify the laws of reflection of sound with two pipes which are not equal in diameter. Can he get correct result and why?

4. State two laws on which reflection of sound occurs.

5. List the precautions used in experiment to verify the laws of reflection of sound.

EXPERIMENT NO. 8

Aim : *To find density of a solid with the help of a spring balance and measuring cylinder.*

Materials required : Spring balance, a piece of metal, measuring cylinder, thread, water.

Theory : Density is mass per unit volume of a substance. Its unit is kg/m^3 or g/cm^3.

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

Procedure :

(i) Tie the piece of the metal (or anything else) with a thread and hang it on a spring balance.

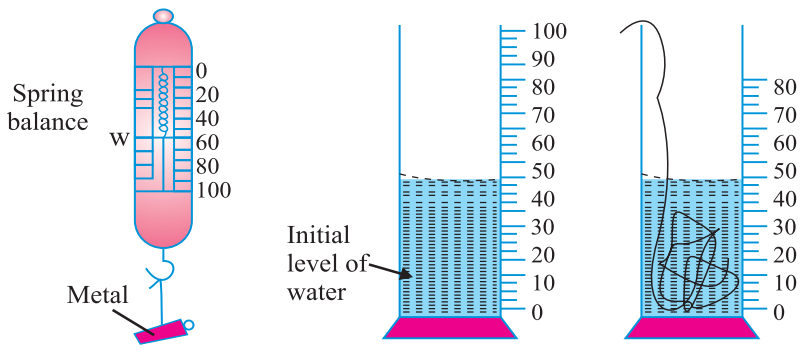
(ii) Find its mass in air.

(iii) Fill a measuring cylinder upto half.

(iv) Immerse this piece of metal fully in water.

(v) Find the volume of displaced water.

(vi) Find the volume with different levels of water.



Observations : Mass of the object (x) = ...grams

S. No.	Initial level of water, V_1	Final level of water, V_2	Displaced water	Volume $V_2 - V_1 = V$
1				V_a =
2				V_b=
3				V_c=

$$\text{Average volume of solid (v)} = \frac{V_a + V_b + V_c}{3} \text{ ml}$$

Calculations : $\text{Density} = \frac{x}{V} \text{ g/cm}^3$

Result : Density of the solid is found to be..... gm/cm^3 .

Precautions :

(i) Metal piece used should be dry.

(ii) Calculate the zero error of spring balance before handling.

(iii) There should be no bubble in water.

(iv) Water should not flow out when we put metal piece in it.

(v) Read only Lower meniscus of water.

Practical Based Questions

1. List four steps to find density of a solid with the help of a spring balance and measuring cylinder.
2. Two students A and B are determining the density of water with the help of spring balance and measuring cylinder. Student A took a solid that is denser than water while student B took a solid that is lighter than water. Which student completed experiment successfully and why?
3. List the precautions used in finding the density of a solid.
4. Weight of a solid in air is 50 gm. It displaces 10 ml water when immersed in water. Find it's density and write unit of density.

EXPERIMENT NO. 9

Aim : *To establish relationship between loss in weight of a solid when fully immersed in (i) tap water, (ii) strongly salty water, with the weight of water displaced by it by taking at least 2 different solids.*

Materials required : Spring balance, measuring cylinder, piece of iron, thread, tap water, brine, piece of wood, overflow jar.

Theory : According to Archimedes principle :

"When an object is completely or partially immersed in water, it experiences a decrease in its weight which is equal to the weight of liquid displaced by the immersed part of solid."

Procedure :

(i) Find weight of an object (glass stopper) in air with the help of spring balance.

(ii) Keep the overflow jar on a wooden block.

(iii) Keep filling the overflow jar till water starts flowing.

(iv) Keep a measuring cylinder at the nozzle of the jar.

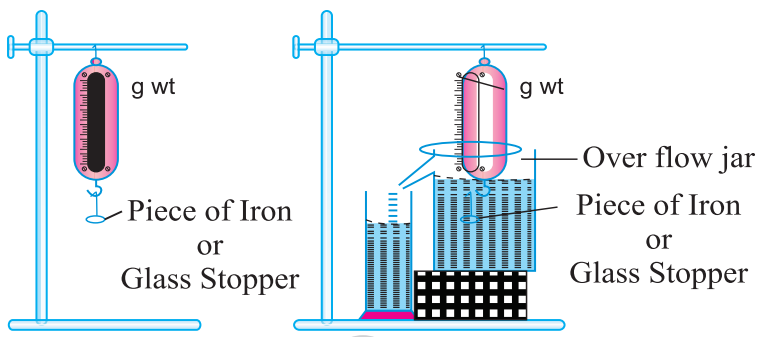
(v) Now, put this spring balance hung with glass stopper, fully immersed in water. Some water will overflow in the measuring cylinder. Find the amount of water collected in the measuring cylinder.

(vi) Note the weight of this glass stopper in water.

(vii) Repeat the steps with piece of iron.

(viii) Repeat the steps with both the objects in brine (saturated solution of salt in water).

Observations :



Object	Weight in air, W_1	Weight in tap water, W_2	Decrease in weight $W_2 - W_1$	Weight in brine, W_3	Decrease in weight, $W_3 - W_1$
1. Glass stopper					
2. Piece of iron					

S. No.	Object	Weight of displaced water (tap water)	Weight of displaced brine
1.	Glass stopper		
2.	Piece of iron		

Conclusion : Weight of displaced water is equal to the weight of object in tap water or brine.

Precautions :

(i) Spring balance should be accurate.

(ii) Measuring cylinder taken should be dry.

(iii) When the object is immersed in water, the water collected in measuring cylinder should not overflow (not even a single drop).

(iv) Object immersed in water should not touch the walls of the container.

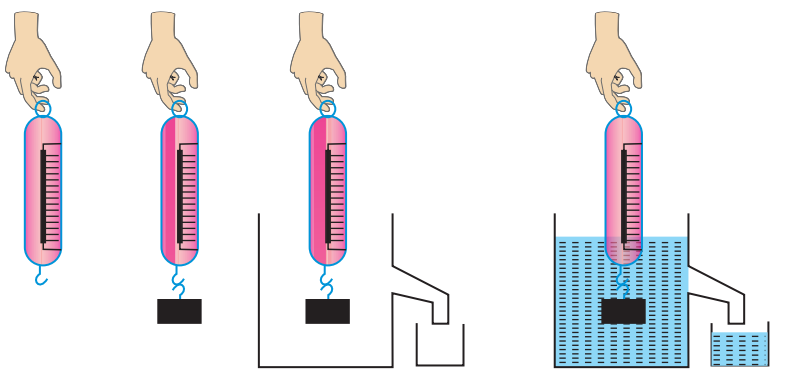
(v) Weight decreased in water should be measured from spring balance only once the object is stable.

(vi) Lower meniscus of colourless solution (Water/Brine) should be read.

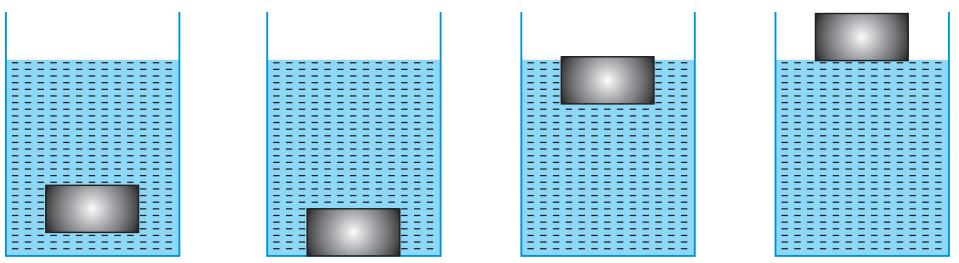
Practical Based Questions

1. In an experiment weight of a solid was measured. Also, weight of displaced water was also measured in the same experiment. Which law is verified by it ? Write law and its definition.

2. Out of the following sketches, which shows measurement of weight of displaced water ?



3. An iron nail sinks in sea water but a ship, which is much heavier keeps floating. Write the details why it happen.
4. To find the density of powdered salt, what was taken in a eureka flask? How can we find the density of any thing?
5. A boat A floats on water, a ship B's lower part is immersed in water and a submarine C is completely immersed in water. Explain in your own words.
6. An experiment shows decrease in the weight of an object when it is immersed in water. Write its principle.
7. In which of the following, the decrease in the weight of an object (when immersed in water) is equal to the weight of the water displaced.



8. If an object is immersed in water in a eureka vessel and then in extremely salty water in the same eureka vessel, what will happen? Describe in your words.

EXPERIMENT NO. 10

Aim : *To find the velocity of pulse propagated through a stretched slinky.*

Materials required : A slinky, stop watch, meter scale.

Procedure :

(i) Take a slinky and spread it on a table or smooth floor as shown in the figure.

(ii) Fix its one end at a fixed point on wall.

(iii) Take the slinky in right hand.

(iv) Jerk your hand from right to left.

(v) A pulse is generated. Calculate the time taken for 50 pulses.

(vi) Let this time taken be T seconds.

(vii) Find the distance between two ends of slinky. Let this be D meters.

(viii) Speed of pulse = $\frac{D}{T/50}$ m/s

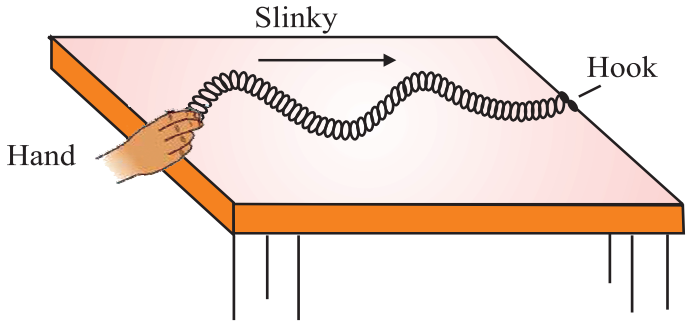
(ix) Repeat the same for 5 times and find the average.

Observations :

Length of slinky = ... m

S. No.	Time for 50 pulses T(s)	Speed
1.		
2.		
3.		
4.		
5.		

Average = ...m/s



Precautions :

(i) Choose a slinky of proper length and ductility.

(ii) Tie one end of slinky properly.

(iii) Start the stop watch as you jerk.

(iv) Give a jerk to slinky horizontally.

Practical Based Questions

1. What kind of waves can be produced in a slinky ? Give definition of these waves.
2. Each particle in a wave propagates within a slinky or a thread. Describe.
3. A wave is produced for a small interval of time. What doyou call it?
4. What precautions should be taken during the experiment done with a slinky?
5. What is a pulse? Describe.
6. When the string of a sitar is stretched and left then which types of waves are produced in sitar and in the air?
7. A wave travels in the form of compression and rarefaction. Tell the name of wave. Also define this wave in your words.
8. Which type of wave is produced in water?

EXPERIMENT NO. 11

Aim : To verify the law of conservation of mass in a chemical reaction.

Materials required : Physical balance, conical flask, ignition tube, thread, cork (rubber), barium chloride and sodium sulphate.

Principle : Law of Conservation of Mass : Matter is neither created nor destroyed. Therefore in a chemical reaction the total mass of the substance remains conserved.

Procedure :

(i) Make aqueous solution of barium chloride and sodium sulphate.

(ii) Barium chloride solution should be taken in an ignition tube and sodium sulphate solution is taken in a conical flask.

(iii) The ignition tube containing barium chloride is hanged with the help of a thread inside the conical flask having sodium sulphate in it and a cork is applied on the mouth of the conical flask.

(iv) The whole apparatus is now weighed carefully.

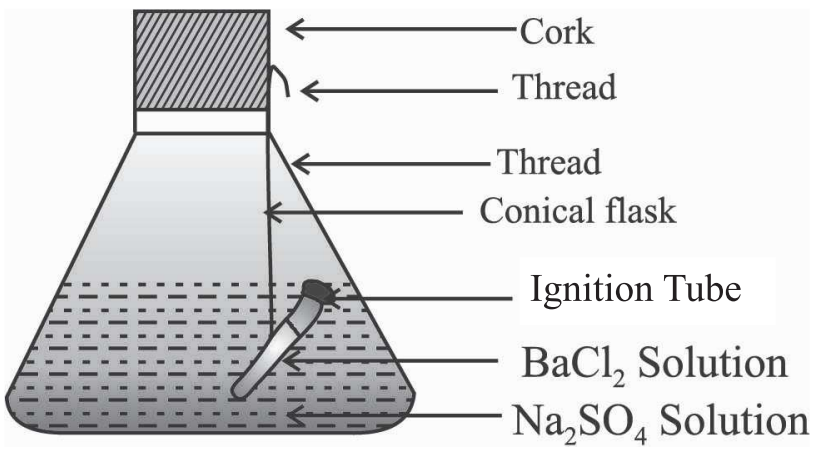
(v) Now tilt the conical flask in such a way that the two solutions get mixed well into each other.

(vi) After the chemical reaction, a white coloured precipitate of Barium sulphate is formed in the conical flask.

(vii) Now again weigh the apparatus in the physical balance.

Inference : The total mass inside the conical flask remains same even after the chemical reaction.

Result : The mass of the substances don't change and it remains conserved. Therefore, it can neither be created nor be destroyed.



Questions

1. What colour changes take place on mixing aqueous solution of barium chloride and sodium sulphate? Why?
2. Write any two characteristics of a solution formed by mixing common salt or Alum in water.
3. You are provided with a mixture of sand and Iodine. How will you proceed to separate the mixture? Name this method. Also draw a labelled diagram of this set up.
4. Why should carbon disulphide be kept away from the flame?
5. 170 g silver nitrate reacts with sodium chloride to give 143.5 g silver chloride and 85 g sodium nitrate. What is the mass of sodium chloride.
6. 12 g Magnesium combine with 16 g Oxygen to give 28 g of Magnesium Oxide. Which law is proved from it?

Practice Question Paper
Annual Examination 2022-23
Class IX
Science-086

Duration : 3 hr M. 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 to 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 questions carrying 02 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 03 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 05 marks each. Answer 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 04 marks each with sub-parts.

SECTION-A

1. On Converting 25°C, 38°C, and 66°C to Kelvin Scale, the Correct sequence of temperature will be
a. 298K, 311 K, 339K b. 298K, 300K, 338K
c. 273 K, 278 K, 543 K d. 298K, 310 K, 338K

2. During Summer, water kept in an earthen pot becomes cool because of the phenomenon of
a. Diffusion b. Transpiration
c. Osmosis d. Evaporation.

3. Which of the following is not a compound:
a. glucose solution b. copper sulphate
c. salt d. oxygen gas

4. The ion of an element has 3 positive charges. If mass number of the atom is 27 and the number of neutrons is 14, what is the number of electrons in the ion?
a.13 b. 10
c.14 d. 16

5. The numerical ratio of displacement to distance for a moving object is
   a. Equal to or less than 1 b. always equals to 1
   c. always less than 1 d. always more than 1

6. Area covered in velocity – time graph depicts
   a. Velocity of an object only b. Distance travelled by an object
   c. height of an object d. none of these

7. Which of the following properties does not describe a compound :
   a. It is composed of two or more elements
   b. It is mixed in any proportion by mass
   c. It cannot be separated into constituent by physical means
   d. None of the above

8. A force of 100 N acts on body of mass 2kg for 10 sec. The change in the Velocity of the body is
   a. 500m/s b. 250m/s
   c .1000m/s d. 100 m/s

9. An example of metal and non-metal that exists in the liquid state are:
   a. Gallium, Mercury b. Mercury, Chlorine
   c. Mercury, Bromine d. Bromine, Sulphur

10. What is the formula of Sodium Carbonate:
   a. Na_2CO_3 b. $NaHCO_3$
   c. $NaCO_3$ d. Na_2HCO_3

11. The ratio by mass of constituent element in sodium chloride is :
   a. 23:36 b. 22:35
   c. 11:17 d. 23:35.5

12. How many electrons are occupied in the 'M' Shell?
   a. 8 b. 16
   c. 18 d. 32

13. Name the phenomenon takes place when cytoplasm of a plant cell shrink in a hypertonic solution:
   a. Phagocytosis b. Plasmolysis
   c. Acidolysis d. Electrolysis

14. What types of epithelial cells are responsible for the absorption of digested food material by the intestine:
a. Stratified squamous epithelium
b. Ciliated epithelium
c. Spindle fibres
d. cuboidal epithelium

15. Epidermis of _____has a coating of cutin.
a. Fungi b. Green Plants
c. Desert plant d. All of the above

16. Generally, Paramecium moves with the help of
a. Villi b. Oral grove
c. Cilia d. None of these

Qs. 17 to 20 are Assertion-Reasoning based questions.
These consist of two statements - Assertion (A) and Reason (R). Answer these questions by selecting the appropriate options 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.

17. Assertion (A): As a ball falls downwards, potential energy keeps decreasing but kinetic energy keeps increasing.
Reason (R): Energy can neither be created nor be destroyed.

18. Assertion (A): Elephants communicate with each other through ultrasonic sounds.
Reason (R): The sound of frequencies higher than 20 KHz, are known as ultrasonic sounds.

19. Assertion (R): The basic objective in mixed cropping is to minimize the risk and insurance against total crop failure due to abnormal weather conditions.
Reason (R): Wheat and chick Pea are examples of intercropping.

20. Assertion (A): Nucleus contain chromosome.
Reason (A): The nucleus is the only organelle present in the cell which have DNA.

SECTION-B

(Q.no. 21 to 26 are very short answer questions) (2 marks each)

21. Differentiate True Solutions and Suspension on the basis of their visibility and stability.

22. Why does steam causes more severe burns than boiling water?

23. Differentiate mixtures and compounds.

24. Calculate the relative abundance of B-10, and B-11. If the average atomic mass of 'B' is 10.8u

25. Write down the configuration of:
    a. Mg (12) b. P (15)
    c. CI (17) d. Ca (20)

26. Which organelle is called the Power House of the Cell and why?

SECTION-C

(Q.no.27 to 33 are short answer questions. (3 marks each)

27. A load of 200 kg is pulled upto 5 meter calculate the work done.

28. (i) Explain the effect of the concentration of the solution on the cell?
    (ii) list two functions of stomata.

29. Differentiate three types of muscles on the basis of their structure and functions. Draw a neat labelled diagram of these three types of muscles.

30. The brakes applied to a car produces deceleration of 6 m/s^2 in opposite directions to the motion. If the car requires 2 seconds to stop after the application of brakes, calculate the distance travelled by the car during this time.

31. (i) Why does a gunman get jerked on a firing of a bullet
    (ii) Explain why seat belts are provided in the car ?

32. State Archimedes Principle. Write its two applications.

33. Derive the formula for kinetic energy.

SECTION-D

(Q.no.34 to 36 are long answer questions) (5 marks each)

34. (i) Draw a well-labeled diagram of mitochondria .
(ii) State any two functions of the Golgi body.
(iii) Which cell organelle is called "Digestive Bag".

35. A scooter acquires a velocity of 36 Km/hr in 10 sec just after the start. Calculate the acceleration of the scooter and the distance covered by the scooter in 10s.

36. (i) Write down the Chemical formula of
a. Magnesium Chloride
b. Aluminium Sulphate
c. Calcium Nitrate
(ii) Calculate the molecular mass of
a. Potassium Hydroxide
b. Sodium Oxide
(K=40, H= 1, 0=16, Na = 23)

SECTION-E

(Q.no. 37 to 39 are case based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.)
(4 marks each)

37. Sound is a mechanical energy that produces a sensation of hearing. It is produced due to the Vibrations of different objects. It propagates as compressions and rarefactions in the medium and is called longitudinal waves. The vibration of different objects causes changes in the pressure and density of the medium Audible range of hearing of the average human being is in the frequency of 20 H, to 20 kHz
a. In which medium sound waves travel faster.
b. A sound produces 50 crests and 50 troughs in 0.5 seconds. What is the frequency of the wave?

or

c. What are longitudinal waves? How sound produces from different objects?

38. Gases are highly compressible as compared to solids and liquids. The LPG cylinder that we get in our home for cooking has compressed gas. CNG is used as fuel these days in vehicles. The liquid takes the Shape of the container in which they are kept. Liquids flow and change shape, so they are not rigid but can be called as fluids. Aquatic animals can breathe underwater. The rate of diffusion of liquids is greater than solids.

a. Why is CNG used as fuel these days in vehicles?

b. Liquids have no fixed shape but have fixed volume. Why?

c. How aquatic animals can breathe underwater?

or

d. Why the rate of diffusion of liquids is greater than solids?

39. Different crops require different climatic conditions of temperature and photo periods for their growth and completion of their cycle. Paddy, soybeans, and pigeon pea are Kharif crops and are grown in the rainy season from June to October. Whereas crops such as wheat, gram, and mustard are Rabi crops which are grown in the winter season from November to April. In India, there has been increasing in the production of food grains from 1952 to 2010 to 4 times with only a 25% increase in cultivable land area.

a. What is Kharif and Rabi cropping season?

b. Plant manufacture their food in sunlight by a process called _____

c. An increase in the production of crops can be achieved through

   i. Crop production improvement
   ii. Crop protection improvement
   iii. Crop protection management
   iv. All of these

or

Give two examples of each Kharif and Rabi crops.

PRACTICE PAPER SET-01
(Class-IX)
Subject - SCIENCE (Code:) 086

Times allowed : 3 Hrs **Maximum Marks : 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 very short questions carrying 02 mark each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer of these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based /case-based units of assessment of 04 marks each with sub parts.

Saction A

1. What is mean by sublimation?

a) change of state directly from solid to liquid without changing into gas state.
b) change of state directly from solid to gas after changing into liquid state.
c) change of state directly from solid to gas without changing into ice state.
d) change of state directly from solid to gas without changing into liquid state.

2. Which of the following is a chemical changes:

a) cutting of trees,
b) making a fruit salad with raw fruits
c) rusting of almirah,
d) melting of wax

OR

Which of the following is a physical changes:

a) melting of butter in a pan,
b) dissolving common salt in water,
c) burning of paper and wood.
d) digestion of food

3. An international scientific organization which approves name of elements, symbol and unit called.....

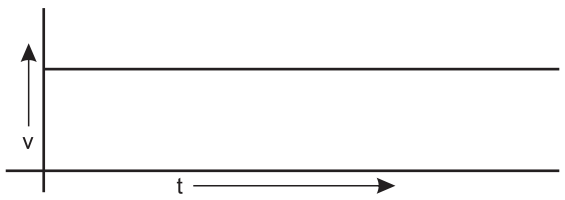
a) Periodic table
b) IUPAC nomenclature
C) Name system
d) None of the above

OR

How to calculate molecular mass.

a) Sum of proton number and electron number
b) Multiplication of proton number and electron number
c) Sum of proton number and neutron number
d) Multiplication of proton number and neutron number

4.



From the given v-t graph, it can be inferred that the object is

a) At rest
b) In uniform motion
c) Moving with uniform acceleration
d) in non-uniform motion

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

If the displacement of an object is proportional to square of time, then the object moves with :

a) Uniform velocity
b) Uniform acceleration
c) Increasing acceleration
d) decreasing acceleration.

5. A passenger in a moving train tosses a coin that falls behind him. It means that the motion of the train is

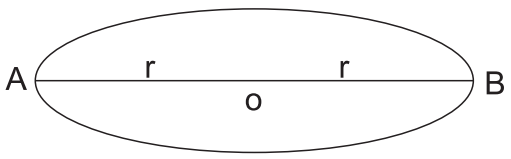
a) Uniform
b) Accelerated
c) Retarded
d) Along circular tracks

OR

A goalkeeper in a football game pulls his hands backwards after holding the ball shot at the goal. This enables the goalkeeper to

a) increase the rate of change of momentum
b) decrease the rate of change of momentum
c) increase the force exerted by the balls on the hands
d) exert larger force on the ball

6. A particle is moving in the circular path of radius r.



The displacement after half a circle would be:

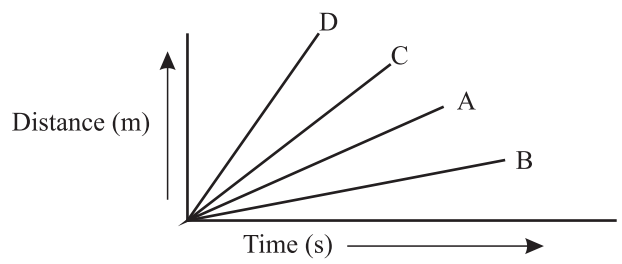
a) Zero b) r
c) 2r d) 2 r

Or (ONLY FOR VISUALLY IMPAIRED STUDENTS)

Which of the following can sometimes be 'zero' for a moving body?

(i) Average velocity (ii) Distance traveled
(iii) Average speed (iv) Displacement
(a) Only (I)
(b) (i) and (ii)
(c) (i) and (iv)
(d) Only (iv)

7. Four cars A, B, C and D moving on a leveled, straight road. Their distance time graphs are shown in the figure below. Which of the following is the correct statement regrading the motion of these cars?



a) Car A is faster than car D b) Car B is the slowest
c) Car D is faster than car C d) Car C is the fastest

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

In a free fall the velocity of a stone is increasing equally in equal intervals of the under the effect of gravitational force of the earth. Then what can you say about the motion of this stone? Whether the stone is having :

a) Uniform acceleration
b) Non-uniform acceleration
c) Retardation
d) Constant speed

8. Which of the following is true for the third law of motion?

a) Action-Reaction pair always acts on the same body.
b) They act on different bodies in opposite directions.
c) Action-Reaction pairs have the same magnitudes and directions.
d) Act on either body at normal to each other.

OR

The inertia of an object causes the object to

a) decrease its speed
b) increase its speed
c) resist any change in the state of its motion.
d) decelerate due to friction.

9. The gravitational force between two bodies does not depend on :

a) their masses
b) their separation
c) the product of their masses
d) the medium between two bodies

OR

What is the value of the acceleration due to gravity on the surface of the Earth?

a) $9.8 ms^{-2}$
b) $18.8\ ms^{-2}$
c) $4\ ms^{-2}$
d) $12\ ms^{-2}$

10. A ball is released from certain height. Which of the following statement is correct about this example?

a) Kinetic energy decreases at each second.
b) Potential energy decreases at each second.
c) Total energy decreases at each second.
d) All of the above.

OR

In which of the following examples does the work done not be zero?

a) The stone is rolling on frictionless surface with constant velocity.
b) A small child pushes a truck but truck remains stationary.
c) Moon revolves around earth because of gravitational force exerted by earth.
d) None of the above.

11. The distance which compression or a rarefaction travels per unit of time gives .....

a) The density of sound wave
b) Speed of sound
c) Wavelength of sound
d) Frequency of sound

OR

The phenomenon where a sound produced is heard again due to reflection is called...

a) Sound bounce b) Mirage
c) An echo d) Interference

12. Which of the following statements are correct ?

(i) Hybridisation means crossing between genetically dissimilar plants.
(ii) Cross between two varieties is called inter specific hybridisation.
(iii) Introducing genes of desired character into a plant gives genetically modified crop.
(iv) Cross between plants of two species is called as inert-varietal hybridisation.

a) (i) and (iii) b) (iii) & (iv)
c) (i) & (ii) d) (ii) & (iv)

13. Rate of evaporation does not increases with

a) Increase of surface area
b) Increase in humidity
c) Increase in temperature
d) Increase in wind speed

14. When no more solute can be dissolved in solution at given temperature is called ..... Solution

a) Homogenous
b) Heterogeneous
c) Saturated
d) Solubility

15. Energy can neither be created nor destroyed. It is a .....

a) Low of Energy reformation
b) Low of Energy recreation
c) Low of conservation of energy
d) Low of conservation of mass

OR

Choose the law of conservation of mass

a) Mass can neither be created nor formed
b) Mass can neither be created nor reform
c) Mass can neither be created nor destroyed
d) Mass can neither be created nor alive.

16. If the L shell accommodate by 8 electrons then valency of element is .....

a) 5 b) 2 c) 6 d) 0

OR

Those elements whose valency is always zero are called as .....

a) Halogen
b) Metals
c) Nonmetals
d) Noble gaseous

For question numbers 17-20 two statements are given- one labeled as Assertion (A) and the other labeled as Reason ®. Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

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

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

c) A is true, but R is false.

d) A is false, but R is true.

17. Assertion A :- Cell membrane is called selectively permeable membrane.

Reason R :- Cell membrane allows or permits the entry of only useful material and exit of waste material across it.

18. Assertion A :- Apical meristem is present at the growing tips of stems and roots.

Reason R :- Apical meristem is always located upper side of plants.

19. Assertion A :- Speed of a moving body is its velocity in a given direction

Reason R :- Velocity of a moving body is its speed in a given direction .

20. Assertion A:- Newton's first law of motion is also known as the law of inertia.

Reason R :- Inertia is the property of an object by virtue of which it resists any change in his position.

SECTION -B

21. A ball is thrown vertically upwards with a velocity of 49m/s^2. Calculate

a) The maximum height to which is rises,

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

OR

Answer the following questions:-

a) What is the acceleration of free fall?

b) What do we call the gravitational force between the earth and an object?

22. Answer the following questions:-

a) A freely falling object eventually stops on reaching the ground. What happens to its kinetic energy?

b) Find the energy in kW h consumed in 10 hours by four devices of power 500W each.

OR

a) Geeta says that the acceleration in an object could be zero even when several forces are acting on it. Do you agree with her? Why?

b) Calculate the work required to be done to stop a car of 1500 kg moving at a velocity of 60km/h.

23. Answer the following questions:-

a) Explain how sound is produced by your school bell.

b) Why are sound waves called mechanical waves?

24. Answer the following questions:-

a) Helium atom has an atomic mass of 4u and two protons in its nucleus. How many neutrons does it have?

b) Which one of the following is a correct electronic configuration of sodium?

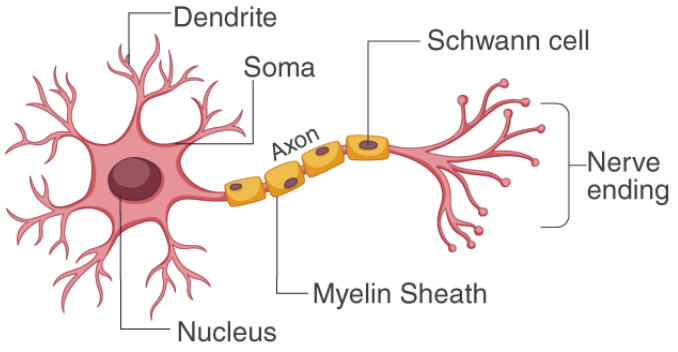
(I) 2,5 (ii) 8, 2, 1 (iii) 2, 1, 8 (iv) 2, 8, 1

25. Answer the following questions:-

a) Why are the lysosomes known as suicidal bags?

b) Where are proteins synthesised inside the cell?

26. Look at the following given picture carefully and answer the following questions.



1. The given picture is of which of the following type of cell?

a) Muscle cell b) Cardiac cell

c) Bone cell d) Nerve cell

2. The structural and functional unit of the nervous system are

a) Neurons b) WBC

c) RBC d) Platelets

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

Answer the following questions:-

1. The longest cell in the humans body is

a) Cardiac cell

b) Bone cell

c) Nerve cell

d) Sperm cell

2. A nerve impulse jumps from one neuron to another through ..... during saltatory conduction.

a) Synpase

b) Axon

c) frontal part of neuron

d) terminal part of neuron

SECTION - C

27. Which of the following is true for displacement? Justify your answer with example.

i) It can be zero.

ii) Its magnitude is greater than the distance traveled by the object.

iii) It can not be zero.

28. A ball thrown up vertically returns to the thrower after 6s. Find

a) The velocity with which it was thrown up.

b) The maximum height it reaches, and

c) Its position after 4s.

OR

A stone is allowed to fall from the top of a tower 100m height and at the same time another stone is projected vertically upwards from the ground with a velocity of 25m/s. Calculate when and where the two stones with meet.

29. Answer the following questions:-

a) Name the three types of simple permanent tissues.

b) What are the constituents of phloem?

c) What are the functions of areolar tissue?

30. Read out the activities listed below carefully. Reason out whether or not work is done in the light of your understanding of the term 'work'.

a) Suma is swimming in a pond.

b) A donkey is carrying a load on its back.

c) A wind-mill is lifting water from a well.

OR

a) An engine is pulling a train.

b) Food grains are getting dried in the sun.

c) A sailboat is moving, due to wind energy.

31. Answer the following questions:-

a) Suppose you and your friend are on the moon. Will you be able to hear any sound produced by your friend?

b) Which wave property determines (i) loudness, (ii) pitch?

c)Guess which sound has a higher pitch. Guitar or car horn?

RO

a) How are the wavelength and frequency of a sound wave related to its speed?

b) Distinguish between loudness and intensity of sound.

c) In which of the three media, air , water or iron, does sound travel the fastest at a particular temperature?

32. Answer the following questions:-

a) Which of the following conditions will give the most benefits? Why?

i) Farmers use high-quality seeds, do not adopt irrigation or use fertilizers.

ii) Farmers use ordinary seeds, adopt irrigation and use fertilizer.

iii) Farmers use quality seeds, adopt irrigation, use fertilizer and use crop protection measures.

b) Why should preventive measures and biological control methods be preferred for protecting crops?

c) What factors may be responsible for losses of grains during storage?

OR

a) Which method is commonly used for improving cattle breeds and why?

b) What management practices are common in dairy and poultry farming?

c) Name two methods or ways of obtaining fish.

33. Answer the following questions:-

a) Define inter-cropping and crop rotation.

b) What are the advantages of inter-cropping and crop rotation?

OR

a) What is genetic engineering ? How is it useful in agricultural practices?

b) What are the benefits of cattle farming?

SECTION-D

34. Answer the following questions:-

a) Tabulate the differences in the characteristics of states of matter,

b) Comment upon any four of the following: (i) rigidity, (ii) compressibility, (iii) fluidity, (iv) filling a gas container, (v) shape, (vi) Kinetic energy and (vii) density.

OR

Give suitable reasons for the following

a) A gas fill completely the vessel in which it is kept.

b) A gas exerts pressure on the wall of the container.

c) A wooden table should be called a solid.

d) We can easily move our hand in air but to do the same through a solid block of wood we need a karate expert.

e) Liquids generally have lower density as compared to solids. But you must have observed that ice floats on water, why?

35. Answer the following questions:-

a) Classify each of the following as a homogeneous or heterogeous mixture: soda water, wood, air , oil, vinegar, filtered tea.

b) How would, you confirm that a colorless liquid given to you is pure water?

c) Which of the following materials fall in the category of a "pure substance"? (i) Ice (ii) Milk (iii) Iron (iv) Hydrochloric acid (v) Calcium oxide (vi) Mercury (vii) Wood (vii) Air.

d) Identify the type of solutions among the following mixtures. (i) Soil (ii) Sea water (iii) Air (iv) Coal (v) Soda water.

e) Which of the following will show "Tyndall effect"? (i) Salt solution (ii) Milk (iii) Copper sulphate solution (iv) Starch solution.

OR

a) Classify the following into elements, compounds and mixtures.

(I) Sodium (ii) Soil (iii) Sugar solution (iv) Silver (v) Calcium carbonate (vi) Tin (vii) Silicon (viii) Coal (ix) Air (x) Soap (xi)Methane (xii) Carbon dioxide (xiii) Blood

b) Give the names of the elements present in the following compounds:

i) Quick lime

ii) Hydrogen bromide

iii) Baking powder

iv) Potassium sulphate

c) Arrange the following in order of increasing density-air exhaust from chimney, honey, water, chalk, cotton, and iron.

36. Answer the following questions:-

a) Write down the formulae of (i) Sodium oxide (ii) Aluminum chloride (iii) Sodium sulphide (iv) Magnesium hydroxide.

b) Calculate the formula unit masses of (i) ZnO, (ii) Na_2O, (iii) K_2CO_3. given atomic masses of Zn=65u, Na=23u, I-39u, C-12u and O=16u.

OR

Write the chemical formulae of the following:

i) Magnesium chloride

ii) Copper nitrate

iii) Aluminum chloride

iv) Calcium carbonate

SECTION-E

37. Protons are present in the nucleus of an atom and determine its atomic number. It is denoted by 'Z'. All atoms of an element have the same atomic number, Z. In fact, elements are defined by the number of protons they possess. The mass of an atom is practically due to protons and neutrons alone. These are present in the nucleus of an atom. Hence protons and neutrons are also called nucleons. Therefore, the mass of an atom resides in its nucleus. It is denoted by 'A'.

Answer the following questions:-

1) Atomic number is denoted by

a) X b) Y

c) Z d) A

2. The sum of the total number of protons and neutrons present in the nucleus of an atom.

a) Atomic number

b) Mass number

c) Atomic weight

d) None of the above

3. Mass number is denoted by

a) A

b) B

c) C

d) Z

4. Identify the correct statement.

Statement 1 - Protons are present in the nucleus of an atom.

Statement 2 - Atomic number is the number of protons of an atom.

Statement 3 - Atomic number is denoted by "Z"

Statement 4 - The mass of an atom is due to protons and neutrons alone.

a) Only 2

b) Both 3 & 4

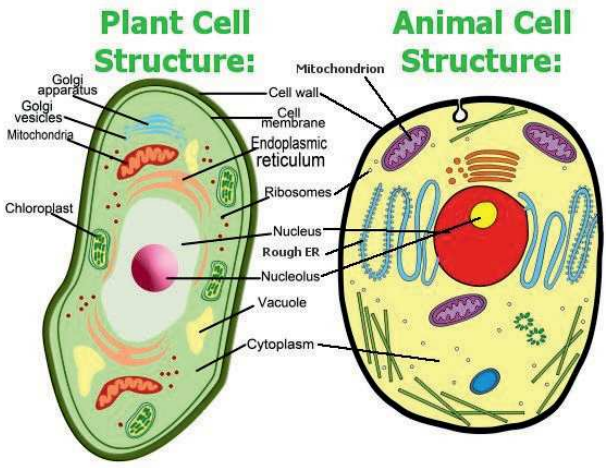
c) Both 1 & 2

d) All of the above

OR

4. Why mass of carbon is 12u give the reason?

38. Based on the below given picture of plant and animal cell, answer the following questions:-



1) Fluid content present in cell called as :

a) Cytoplasm

b) Vacuole

c) Proteins

d) Chromosomes

2. The cell organelle which plays crucial role in detoxifying many poisons and drugs is :

a) Endoplasmic Reticulum

b) Mitochondria

c) SER (Smooth Endoplasmic Reticulum)

d) RER (Rough Endoplasmic Reticulum)

3. The membrane bound sacs in the cell which are filled with digestive enzymes are :

a) Cytoplasm

b) Vacuole

c) Proteins

d) Lysosomes

4. Numerous membrane layers present in chloroplast called .....

a) Cytoplasm

b) Vacuole

c) Mitochondria

d) Stroma

OR

The cell organelle which generates and provide energy to the cell for its activities, in the form of ATP is :

a) Nucleus
b) Golgi Body
c) Endoplasmic Reticulum
d) Mitochondria

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

A cell is capable of forming the structure of the body of the organisms and independently carrying out all necessary activities of life. So, the are called basic structural as well as functional unit of the life. Its, all activities are carried out by different cell organelles present in ti.

Answer the following questions:-

1) The cell organelles which have their own genetic material are

a) Chloroplast
b) Mitochondria
c)Ribosome and Golgi body
d) A and B both

2. Which cell organelle is known as power house of the cell

a) Ribosome
b) Mitochondria
c) Nucleus
d) Endoplasmic reticulum

3. Which cell organelle is known as kitchen house of the cell?

a) Mitochondria
b) Chloroplast
c) Endoplasmic reticulum
d) Golgi body

4. The cell organelle which control the activities of the cell is

a) Nucleus
b) Ribosomes
c) Lysosomes
d) Mitochondria

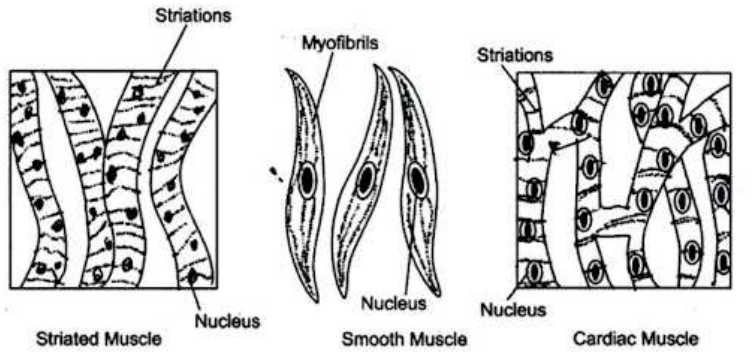
OR

Cell organelle through which materials passes in and out of the cell is:-

a) Nucleus b) mitochondria

c) Cell membrane d) Ribosome

39. Three pictures of the three types of muscle fibres such as striated muscles, smooth muscels (unstriated muscle fiber) and cardiac muscles are given below. Look at all the pictures carefully and based on their structure and site/ location in the body, differentiate between these three types of muscles.



OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

In a family, a paralytic patient was unable to walk. "The family member of the patient took the utmost care of the patient.

Answer the following questions:-

a) Name two tissues responsible for the movement of a body.

b) Name the tissues present in brain and spine.

c) Name the tissue which joins muscle to bone.

d) Name the muscle fibre present in heart.

Set-1
Subject - SCIENCE (Code :) 86
(MARKING SCHEME)
Time Allowed : 3 Hrs
Maximum Marks : 80

SECTION A

1. d) Change of state directly from solid to gas without changing into liquid state.
2. c) rusting of almirah,

OR

a) melting of butter in a pan

3. b) IUPAC nomenclature

OR

c) Sum of proton number and neutron number

4. b) In uniform motion

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

b) Uniform acceleration

5. b) accelerated

OR

b) decrease the rate of change of momentum

6. c) 2r

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

c) (i) Average velocity and (iv) Displacement.

7. b) Car B is the slowest

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

a) Uniform acceleration

8. b) Action and Reaction act on different bodies in opposite directions.

OR

c) resist any change in the state of its motion .

9. d) the medium between the two bodies

OR

a) 9.8 m/s2

10. b) potential energy decreases at each second.

OR

d) none of the above

11. b) Speed of sound

OR

c)An echo

12. c) (i) & (ii)
13. b) Increase in humidity
14. d) Solubility
15. c) Law of conservation of energy

OR

C) Mass can neither be created nor destroyed

16. d) 0

OR

d) Noble gases

17. A) 0
18. B)
19. D)
20. B)

SECTION B

21. Initial velocity u=49 m/s
Final speed v at maximum height = 0
Acceleration due to earth gravity g=-9.8 m/s^2 (thus negative as ball is thrown up).

a) By third equation of motion,
$2gH=v^2-u^2$
$2x(-9.8) \times H=0-(49)^2$
$-19.6H = -2401$
$H = 122.5$ m
b) Total time T = Time to ascend (T_a) + Time to descend (T_d)
$v = u + gt$
$0 = 49 + (-9.8) \times T_a$
$T_a = (49 / 9.8) = 5s$
Also, $T_d = 5s$
Therefore $T = T_a + T_d$
$T = 5 + 5$
$T = 10s$

OR

a) Acceleration due to gravity is the acceleration gained by an object due to gravitational force. On Earth, all bodies experience a downward force of gravity which earth's mass exerts on them. The Earth's gravity is measured by the acceleration of the freely falling objects. At Earth's surface, the acceleration of gravity is 9.8 m/s^2 and it is denoted by 'g'. Thus, for every second an object is in free fall, its speed increases by about 9.8 meters per second.

b) The gravitational force between the earth and an object is called weight. Weight is equal to the product of acceleration due to the gravity and mass of the object.

22. a) When an object falls freely towards the ground, its potential energy decrease, and kinetic energy increase; as the object touches the ground, all its potential energy becomes kinetic energy. Since the object hits the ground, all its kinetic energy becomes heat energy and sound energy. It can also deform the ground depending upon the ground's nature and the amount of kinetic energy possessed by the object.

b) Given,
Power rating of the deice (P) = 500 W == 0.50 kW
Time for which the device runs (T) = 10h
Energy consumed by an electric device can be obtained by the expression
Power = Energy consumed / Time taken
Energy consumed = Power x Time
Energy consumed = 0.50 x 10
Energy consumed = 5 kWh
Thus, the energy consumed by four equal rating devices in 10 h will be
=> 4 x 5 kWh
= 20 kWh

OR

a) Acceleration in an object could be zero even when many forces work on it. This happens when all the forces get rid of one another, i.e., the overall force working on the object is zero. For a uniformly moving object, the online force working on the it is Zero. Hence, the acceleration of the thing is zero. Hence, Geeta is correct.

b) Given
The Mass of the body = 1500kg
Velocity v = 60 km/hr
$= \frac{60 \times 1000\ m}{3600\ s}$
=50/3 m/s
The work required to stop the moving car = change in kinetic energy.

23. a) When the school bell is hit with a hammer, it moves forward and backwards, producing compression and rarefaction due to vibrations. This is how sound is produced by teh school bell.
b) Sound waves require a medium to propagate to interact with the particles present in them. Therefore, sound waves are called mechanical waves.

24. a) Answer :
Atomic mass of He = 4u.
Atomic mass = No. of protons + No of neutrons
4 = 2 + no. of neutrons.
No. of neutrons = 4 - 2 = 2
Helium atom has 2 neutrons
b) Answer : - (iv) 2, 8, 1

25 a) When the cell gets damaged, lysosomes may burst, and the enzymes digest their own cell. Therefore, lysosomes are known as suicide bags.

b) The proteins are synthesised in the ribosomes that are also known as protein factories.

26. 1. d) Nerve cell

2. a) Neurons

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

1. c) Nerve Cell

2. a) Synapse

SECTION -C

27. (i) is true for displacement.

Yes, an object which has moved through a distance can have zero displacement if it comes back to its initial position.

Example : If a person jogs in a circular park which is circular and completes one round. His initial and final position is the same.
Hence, his displacement is zero .

28. Given data :
$g = 10\ m/s^2$
Total time $T = 6$ sec
$t_a = t_d = 3$ sec

a) Final velocity at maximum height $v = 0$
From first equation of motion :-
$v = u - gt_a$
$u = v + gt_a$
$= 0 + 10 \times 3$
$= 30$ m/s
The velocity with which stone was thrown up is 30 m/s.

b) From second equation of motion

$$s = ut_a - \frac{1}{2} g (t_a)^2$$

$= 30 \times 3 - (1/2) \times 10 \times (3)^2$
$= 90\text{-}45 = 45$m
The maximum heigh stone reaches is 45 m.

c) In 3 sec, it reaches the maximum height.
Distance traveled in another 1 sec = s'

$$s = ut_a - \frac{1}{2} g (t_a)^2$$

$$s = 0 + \frac{1}{2} \times 10 \times 1 \times (1)^2$$

$s = 5$m.

The distance traveled in another 1 sec = 5 m

Therefore in 4 sec, the position of point p (45 - 5)
= 40m from the ground.

OR

(i) When the stone from the top of the tower is thrown,
Initial velocity u' = 0
Distance traveled = x
Time taken = t
Therefore,

$s = ut + \frac{1}{2} gt^2$

$x = 0 + (1/2)gt^2$
$x = 5t^2$ .....(a)

(ii) When the stone is thrown upwards,
Initial velocity u = 25 m/s
Distance traveled = (100 - x)
Time taken = t

$s = ut - \frac{1}{2} gt^2$

$(100 - X) = 25t - (1/2) \times 10 \times t^2$
$x = 100 - 25t + 5t^2$.....(b)

From equations (a) and (b)
$5t^2 = 100 - 25t + 5t^2$
t = (100/25) =4sec.
After 4 sec, two stones will meet
from (a)
$x = 5t^2 = 5 \times 4 \times 4 = 80$
putting the value of x in (100 - x)
= (100 - 80) = 20 m
This means that after 4 sec, 2 stones meet a distance of 20 m from the ground.

29. a) Parenchyma, collenchyma and sclerenchyma are the three forms of simple permanent tissues. Aerenchyma and chlorenchyma are two types of parenchyma tissue.

    b) The food-conducting tissue of plants is termed as phloem. Sieve tubes,

Companion cells, Phloem parenchyma and phloem fibers are the four components.

c) Areolar tissues are commonly seen in animals. They are connective tissues that exist between the skin and the muscles. They can also be found in the bone marrow and around blood arteries and nerves. These tissues take up a lot of room inside the organs. They protect the internal organs and aid in tissue restoration in the event of harm.

30. Work is finished whenever the given 2 conditions are satisfied :
(i) A force acts on the body.

(ii) There's a displacement of the body by applying force in or opposite to the direction of the force.

a) While swimming, suma applies a force to push the water backwards. Therefore, Suma swims in the forward direction caused by the forward reaction of water. Here, the force causes a displacement. Hence, the work is done by Seema while swimming.

b) While carrying a load, the donkey has to apply a force in the upward direction. But, displacement of the load is in the forward direction. Since displacement is perpendicular to force, the work done is zero.

c) A windmill works against gravity to elevate water. The windmill lift water by applying a force in an upward direction, and thus the water is moving in the same upward direction itself. Hence, work is done by the windmill to lift water from the well.

OR

a) When an engine is pull in a train, it is applying a force in the forward direction. So, it is moving in the forward direction. Since displacement and force are in the same direction. Hence, work is done by the engine.

b) There is no force involved in the process of drying food grains in the sun and the grains do not move. Since there is no force or displacement. Hence, no work is done.

c) When a saiboat is moving due to wind energy, it is applying force in the forward direction. So, it is moving in the forward direction. Since displacement and force are in the same direction. Hence, work is done.

31. a) No. Sound waves require a medium to propagate. Due to the absence of an atmosphere on the moon and since sound cannot travel in a vaccume.; I will not be able to hear any sound produced by my friend.

b) (i) Amplitude :- The loudness of the sound and its amplitude is directly related to each other. The larger the amplitude, the louder the sound.

(ii) Frequency :- The pitch of the sound and its frequency is directly related to each other. If the pitch is high, then the frequency of sound is also high.

c) The pitch of the sound is directly proportional to its frequency. Therefore, the guitar has a higher pitch when compared to a car horn.

OR

a) Wavelength, speed and frequency are related in the following way :
Speed = Wavelength x frequency
$v = \lambda\nu$.

b) The amount of sound energy passing through an area every second is called the intensity of a sound wave. Loudness is defined by its amplitude.

c) Sound travels faster in solids when compared to any other medium. Therefore, at a particular temperature, sound travels fastest in iron and slowest in air.

32. a) Here answer is (iii) Farmers use quality seeds, adopt irrigation, use fertilizer and use crop protection measures. Use of any quality seeds is not sufficient until they are properly irrigated, enriched with fertilizers and protected from biotic factors. Hence, option (c) will give the most benefits.

b) Diseases in plants are caused by pathogens. To get rid of pathogens, some preventive measures and biological control methods are used as they are simple, economic and minimise pollution without affecting the soil quality.

c) The factors responsible for losses of grains during storage are :

(i) Abiotic factors like moisture (present in food grains) humidity of air and temperature.

(ii) Biotic factors like insects, rodents, birds, mites, bacteria and fungi.

OR

a) Cross breeding is a process in which indigenous varieties of cattle are crossed by exotic breeds to get a breed which is high yielding. During cross breeding, the desired characters are taken into consideration. The offspring should be high yielding, should have early maturity and should be resistant to climatic conditions.

b)
(i) Shelter : Dairy animals and poultry birds require proper shelter, i.e. well designed dairy and hygienic shelter.

(ii) Feeding : To get good yield of food product, proper feed is provided to dairy animals and poultry birds.

(iii) Caring for animal health : Animal and birds must be protected from diseases caused by virus, bacteria or fungi.

c) There are two ways of obtaining fish. One is from natural resources, which is called capture fishing. The other way is by fish farming, which is called culture fishery.

33. a) Intercropping can be defined as growing of two or more crops with different nutrient requirements, simultaneously on the same field in a definite pattern.
Crop rotation is a system of growing different kinds of crops in recurrent succession on the same land.

(b) Advantages of using inter-cropping :
1. It helps to maintain soil fertility.
2. It increases productivity per unit area.
3. Save labour and time.

4. Both crops can be easily harvested and processed separately.

Advantages of using crop rotation :

1. It improves the soil fertility.
2. It avoids decrease of a particular nutrient from soil.
3. It minimize pest infestation and disease.
4. It helps in weed control.
5. It prevents change in the chemical nature of the soil.

OR

a) Genetic manipulation is a process of incorporating desirable (genes) characters into crop varieties by hybridisation. Hybridisation involved crossing between generically dissimilar plants. This is done for production of varieties with desirable characteristics like produce branching in fodder crops, high yielding varieties in maize, wheat, etc. Genetic manipulation is useful in developing varieties which shows :

1. Increased yield
2. Better quality
3. Shorter and early maturity period.
4. Better adaptability to adverse environmental conditions
5. Desirable characteristics

b) Cattle farming is beneficial in the following ways:

1. Mild production is increased by high yielding animals.
2. Good quality of meat, fiber and skin can be obtained.
3. Good breed of drought animals can be obtained.

SECTION-D

34. (a) Differences in the characteristics of 3 states of matter

Characteristics	**Solid**	**Liquid**	**Gas**
1. Shape	fixed shape	no fixed shape	no fixed shape
2. Volume	fixed volume	fixed volume	no fixed volume
3. Rigidity/ Fluidity	are rigid, cannot flow	can flow, not rigid	can flow, not rigid
4. Intermolecular force	maximum	less then solids	very less
5. Intermolecular space	very less	more then solids	maximum and less then gas
6. Compressibility	negligible	compressible	highly compressible

b)
(i) Rigidity : The tendency of a substance to retain/maintain their shape when subjected to outside force.

(ii) Compressibility : The matter has intermolecular space. The external force applied on the matter can bring these particles closer. This property is called compressibility. Gases and liquids are compressible.

(iii) Fluidity : The tendency of particles to flow is called fluidity- liquids and gases flow.

(iv) Filling of a gas container : Gases have particles which vibrate randomly in all the directions. The gas can fill the container.

(v) Shape : Solids have maximum intermolecular force and definite shape. Whereas liquids and gases takes the shape of container.

(vi) Kinetic energy : The energy possessed by particles due to their motion is called kinetic energy. Molecules of gases vibrate randomly as they have maximum kinetic energy.

(vii) Density : It is defined as mass per unit volume, the solids have highest density.

OR

(a) The molecules of gas have high kinetic energy due to which they keep moving in all directions and hence fill the vessel completely in which they are kept.

(b) A gas exerts pressure on the walls of the container because the molecules of the gas are in constant random motion due to high kinetic energy. These molecules constantly vibrate, move and hit the walls of the container thereby exerting pressure on it.

(c) The molecules / particles of wooden table are tightly packed with each other, there is no intermolecular space, it cannot be compressed, it can not flow, all these characteristics are of solid. So wooden table should be called a solid.

(d) We can easily move our hand in air but to do the same through a solid block of wood we need a karate expert. It is because the molecules of air has less force of attraction between them and a very small external force can separate them and pass through it. But in case of solids, the molecules have maximum force of attraction, the particles are tightly bound due to this force. Hence large amount of external force is required to pass through solid.

(e) Ice is a solid but its density is lower than water due to its structure. The molecules in ice make a cage like structure with lot of vacant spaces, this makes ice float on water.

35. a) Homogeneous : Soda water, vinegar, filtered tea, air.
Heterogeneous : wood, soil.

b) By finding the boiling point of a given colorless liquid. If the liquid boils at 100 ^{0}C at atmospheric pressure, then it is pure water. this is because pure substances have fixed melting and boiling point.

c) Pure substances are : Ice, Iron, Hydrochloric acid, calcium oxide and mercury.

d) Solutions are : Sea water, soda water and air.

e) Milk and starch solution.

OR

(a)

Elements	Compounds	Mixtures
Sodium	Calcium carbonate	Sugar solution
Silver	Methane	Soil
Tin	Carbon dioxide	Coal
Silicon	Soap	Air, Blood

(b)

(i) Quick lime (Calcium oxide) Elements - Calcium and oxygen

(ii) Hydrogen bromide, Elements - Hydrogen and bromine

(iii) Baking powder (Sodium hydrogen carbonate) Elements - Sodium,

hydrogen, carbon and oxygen

(iv) Potassium sulphate-Elements - Potassium, sulphur and oxygen

©
Air < Exhaust from chimney < Cotton < Water < Honey < Chalk < Iron.

36. (a)

(i) Formula of sodium oxide

Symbol	Na	O
Charge	+1	-2
Formula	Na_2O	

(ii) Formula of aluminium chloride

Symbol	Al	Cl
Charge	+3	-1
Formula	$AlCl_3$	

(iii) Formula of Sodium sulphide

Symbol	Na	S
Charge	+1	-2
Formula	Na_2S	

(iv) Formula of Magnesium Hydroxide

Symbol	Mg	OH
Charge	+2	-1
Formula	$Mg(OH)_2$	

(b)

(i) ZnO = 65 u + 16 u = 81u

(ii) Na_2O = (23 u x 2) + 16 u = 46 u + 16 u = 62 u

(iii) K_2CO_3 = (39 u x 2) + 12 u +16 u X 3 = 78 u + 12 u + 48 u = 138 u

©
(i) Quick lime ---> Calcium oxide - Elements --> Calcium and oxygen

(ii) Hydrogen bromide _ Element - > Hydrogen and bromine

(iii) Baking Powder - Sodium hydrogen carbonate - Elements --> Sodium, Hydrogen, carbon and oxygen

(iv) Potassium sulphate - Elements --> Potassium, sulphur and oxygen

OR

(i) Magnesium chloride - symbol --> Mg^{2+}, Cl^- - Charge----> +2 -1Formula ----> $MgCl_2$

(ii) Copper nitrate - Symbol---> Cu^{2+} , NO_3^- charge +2 -1 Formula -4-----> $Cu(NO_3)_2$

(iii) Aluminium chloride - symbol ---> Al^{3+}, Cl^---- Charge----> +3 -1 Formula-----> $AlCl_3$

(iv) Calcium carbonate - symbol ---> Ca^{2+}, CO_3^{2-} Charge ---> +2 -2 Formula ---> $CaCO_3$

SECTION E

37. (1) © Z

(2) (b) Mass number

(3) (a) A

(4) (d) All of the above

OR

Mass of carbon is 12 u because it has 6 protons and 6 neutrons,
6 u + 6 u = 12 u

38. (1) (a) Cytoplasm

(2) (c) SER (Smooth Endoplasmic Reticulum)

(3) (d) Lysosomes

(4) (d) Stroma

OR

(d) Mitochondria

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

(1) (b) A and B both

(2) (b)Mitochondria

(3) (b) Chloroplast

(4) (a) Nucleus

OR

(C) Cell membrane

39. Differences between striated, unstriated and cardiac muscles:-

Striated muscle	**Unstriated muscle**	**Cardiac muscle**
On the basis of structure :		
Cells are cylindrical	Cells are long	Cells are cylindrical
Cells are not branched	Cells are not branched	Cells are branched
Cells are multinucleate	Cells are uninucleate	Cells are uninucleate
Alternate light and dark bands are present	There are no bands present	Faint bands are present
Its ends are blunt	Its ends are tapering	It ends are flat and wavy
On the basis of location :		
These muscles are present in body parts such as hands, legs, tongue, etc.	These muscles control the movement of food in the alimentary canal, the contraction and relaxation of blood vessels, etc.	These muscles control the contraction and relaxation of the heart.

OR (ONLY FOR VISUALLY IMPAIRED STUDENTS)

A)The two tissues responsible for movement of the body are muscular tissues and nervous tissues.

(b) The tissues present in brain and spine are nervous tissues.

(c) Tendon

(d) Cardiac Muscle.

PRACTICE PAPER -02

(Class-IX)

Subject - SCIENCE (Code:) 086

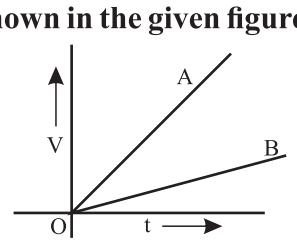
Times allowed : 3 Hrs **Maximum Marks : 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 very short questions carrying 02 mark each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer of these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based /case-based units of assessment of 04 marks each with sub parts.

SECTION - A

1. Two velocity time graphs are shown in the given figure which indicates a higher rate of change?



a) Only A
b) Only B
c) Both A and B
d) Cant be said

2. Who discovered free living cells for the first time ?

a) Robert hooke
b) A.V. leeuwen hoek
c) R. Virchow
d) Both (b) and (c)

3. The tissue responsible for the growth of plant is

a) Permanent tissue b) meristematic tissue
c) Epidermis d) None of the above

4. **Suppose two bodies of A and B or masses m1 and m2 are lying at a distance d from each other. Let the force of attraction between two bodies be F. How does the force of gravitation change when the distance between A and B is reduced to half?**
   (a) The force would become 2 times
   (b) The force would become 3 times
   (c) The force would become 4 times
   (d) The force would become 5 times
5. **Water stored in a dam has potential energy due to**
   a) Position
   b) Shape
   c) Colour
   d) Motion
6. **Valency of an element A is +3 which of the following would be the chemical formula of its oxide?**
   a) AO b) A_2O_3
   c) A_3O_2 d) AO_3
7. **When a sound wave goes from one medium to another, which one of the following quantities remains unchanged?**
   a) speed
   b) Wavelength
   c) Frequency
   d) Amplitude
8. **Bronze is an alloy made up of**
   a) Copper + Tin
   b) Copper + Zinc
   c) Copper + Zinc + Nickel
   d) None of the above
9. **Which of the following instruments is based on Archimedes principle?**
   a) Galvanometer
   b) Hydrometer
   c) Odometer
   d) Ohm meter

10. The value of G on earth is 6.67×10^{-11} $Nm^2 Kg^{-2}$ what will be value of G on moon?

a) 6.67×10^{-8} $Nm^2 Kg^{-2}$
b) 6.67×10^{-10} $Nm^2 Kg^{-2}$
c) 6.67×10^{-9} $Nm^2 Kg^{-2}$
d) 6.67×10^{-11} $Nm^2 Kg^{-2}$

11. The frequency of waves used in ultrasonography is

a) 2 Hz to 20 Hz
b) 20 Hz to 20000 Hz
c) 2000 Hz to 20000 Hz
d) 2 MHz to 18 MHZ

12. 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) X^{31}_{15}
b) X^{31}_{16}
c) X^{16}_{15}
d) X^{15}_{16}

13. If a cell is placed in a hypotonic solution, water will move .....the cell, causing it to .....

a) into , swell
b) out of , shrink
c) in and out of the cell, stay the same
d) none of the above

14. In case of negative work, the angle between the force and displacement is

a) 0^0
b) 45^0
c) 90^0
d) 180^0

15. **Which among the following decreases the rate of evaporation ?**
    a) Temperature
    b) Humidity
    c) Surface area
    d) Wind speed
16. **Osmosis is a special kind of**
    a) Regulation
    b) Absorption
    c) Diffusion
    d) Adsorption

For question numbers 17-20 two statements are given- one labeled as Assertion (A) and the other labeled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
c) A is true, but R is false.
d) A is false, but R is true.

17. **(A) :** A mellifera bee are used for commercial honey production.
    (R) : A mellifera bee have high honey collection capacity and also they breed very well.

18. **(A) :** Isotopes show the same chemical properties.
    (R) : Since different isotopes have the same electronic configurations, they have the same chemical properties.

19. (A) : Muscles are connected to bones by tendons.
    (R) : Tendons are tough, inelastic bundles which connect skeletal muscles with bones.

20. (A) : The value of displacement can be negative, positive and zero, whereas distance gives a positive value.

(R) : Displacement is a vector quantity and distance is a scalar quantity.

SECTION B
(Question 21 to 26 are very short answer questions)

21. A man of weight 400 N lifted a weight of 200 N up to 3 meter flight of stairs. What exactly is the power of the man?

22. Broiler, production is a solution to increase the production of nutritions animal protein food. List four factors that need to be considered for broiler production.

23. a) Camphor disappears with time without leaving any solid. Give the reason?
    b) Gases diffuse quickly. why?

24. A person drinks a concentrated solution of salt and after sometime, he starts vomiting. What is the phenomenon responsible for such a situation?

25. Rohit was going to Haridwar with his family in a taxi. He saw the driver tied the luggage kept on the roof of the taxi with a rope. What could be the reason for that?

26. Rutherford selected a gold foil in his alpha ray scattering experiment. Justify his selection.

SECTION C
(Q No,. 27 to 33 are short answer questions)

27. a) What is the situation where a body's average velocity and average speed are the same?
    b) Is it possible that the train you are on appears to be moving while it is actually stationary?
    c) A trolley, while going down on inclined plane, has an acceleration of $2ms^{-2}$. What will be its velocity 3 sec after the start?

28. a) In chemistry class, teacher asked Komal that the electronic configuration of Fluoride ion and neon is the same. Then what is the difference between them?
b) Why do inert gases have zero valencies?
c) Name three isotopes of Hydrogen.

29. Rahul prepared temporary mounts of onion peel cell and human cheek cell in the laboratory. Mention any three differences between these two types of cells.

30. Define crop rotation. while choosing crops for crop rotation, what factors should be kept in mind?

31. If the earth's density is halved but its radius remains unchanged, what will be the change in acceleration due to gravity?

32. In a house, six bulbs of 100 W, two fans of 60W and two ACs of 2KW are operated for 4 hours everyday. Calculate the following :
a) Total power consumed everyday
b) Total power utilized in 30 days
c) Total electrical energy consumed in 30 days

33. Write balanced chemical equations for the following reactions :
a) Burning of magnesium ribbon in air
b) Zinc with dilute sulphuric acid
c) Sodium sulphate with barium chloride in the form of their solutions in water

SECTION - D
(Q no. 34 to 36 are long answer questions)

34. Two objects of masses m_1 and m_2 having the same size are dropped simultaneously from heights h1 and h2 respectively. Find out the ratio of

time they would take in reaching the ground, will this ratio remain the same if

a)one of the objects is hollow and the other one is solid

b) both of them are hollow; size remaining the same in each case? give a reason

35. a) Differentiate between rough and smooth endoplasmic reticulum, how is endoplasmic reticulum important for membrane biogenesis?
    b) What happens when plasma membrane of a cell breaks down?

36. a) If 18 gm of pure water is electrolysed, 2 gm of hydrogen and 16 gm of oxygen is obtained. Which law of chemical combination is illustrated by this statement?
    b) State the law of constant proportion. Illustrate with the help of an example.
    c) Which postulate of Dalton's atomic theory is the result of law of conservation of mass?
    d) Which point of Dalton's atomic theory came from law of constant proportions?

SECTION E

(Q no. 37 to 39 are case based / data based questions with 2 to 3 sub-parts)

37. While going on a trip, Rehan found that the taxi was moving along a straight line with a uniform velocity of 108 Km/h. The velocity of the taxi slows down to 72 Km/h in 4 sec by an external force. The mass of the taxi is 600 Kg.
    a) Find the initial velocity and final velocity in meter per second
    b) Find the change of momentum.
    c) How much external force is applied on the taxi?

38. Reena and Tina were exploring different processes for separating different components from a mixture. They were given the mixture of iron filings

and sulphur powder. Reena heated the mixture strongly and she observed that a new substance was formed. Tina did not do anything with the iron filings and the sulphur powder that was given to her.

a) After heating Reena got a new substance. What is the nature of this new substance, mixture or compound? What is the name and colour of this new substance?

b) How will you differentiate between mixtures and compounds?

39. In the Physics laboratory, Rishi was doing an experiment on a tuning fork. He observed that the object is vibrating 1200 times in one minute, if the velocity of sound in air is 360m/s

a) Calculate the frequency of sound

b) What will be the wavelength of sound?

c) A sound travels at a speed of 339m/s. If its wavelength is 3.0 cm, what is the frequency of the wave? Will it be audible?

PRACTICE PAPER -03

(Class-IX)

Subject - SCIENCE (Code:) 086

Times allowed : 3 Hrs **Maximum Marks : 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 very short questions carrying 02 mark each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer of these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based /case-based units of assessment of 04 marks each with sub parts.

SECTION - A

The rate of diffusion will be higher in :

a Liquids b) Solids

c) Gases d) Semi solids

2. **Under normal condition, the maximum temperature that can be achieved by heating water is :**

a) 100 ^{0}C b) 120 ^{0}C

c) 0 ^{0}C d) above 120 ^{0}C

3. **The correct symbol of sodium element is :**

a) Na b) Sa

c) NA d) S

4. **The constituent charged particles present in Sodium chloride are :**

a)Negatively charged sodium ion and positively charged chloride ion

b)Positively charged sodium ion and positively charged chloride ion

c) Negatively charged sodium ion and negatively charged chloride ion
d) Positively charged sodium ion and negatively charged chloride ion

5. The subatomic particles and their correct representation is :

(i) Proton (P-)
(ii) Proton (P+)
(iii) Electron (e-)
(iv) Electron (e+)

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

6. The number of valence electron in an atom having atomic number 14 is :

a) 2 b) 4
c) 8 d) 14

7. Generally, Nucleus of the plants cell are not centrally located due to:

a) large sized vacuoles
b) insufficient space in the cell
c) small sized vecuoles
d) none of the above

8. Xanthium and Parthenium are examples of

a) Pesticides b) Diseases
c) Pathogens d) Weeds

9. Which is not a connective tissue:

a) blood b) cartilage
c) muscle d) bone

10. The relation between speed (v) wavelength (l) and frequency (f) of a sound wave is :

a) v = l x f b) l = f x v
c) v = f / l d) l = f + v

11. Cattle husbandry is done for :

(i) increasing milk production (ii) increasing meat production.
(iii) agriculture work (iv) egg production
(a) i, ii, and iii (b) i and ii
(c) ii, iii and iv (d) i , iii and iv

12. **Note is :**
    (a) a sound of single frequency
    (b) a sound of mixture of several frequency
    (c) a sound of two frequency
    (d) unpleasant of hear.
13. **Universal Law of Gravitation does not explain:**
    a) the force that binds us with the earth
    b) motion of moon around the earth
    c) the tides due to the moon and the sun
    d) volcanic eruption
14. **The intercellular space is present in :**
    a) Parenchyma
    b) Collenchyma
    c) Sclerenchyma
    d) Epidermis
15. **A student placed an onion partially dipped in water. After few days she observed the root which grow in size. The tissue present on the tip of these root is :**
    a) Apical meristem
    b) Intercalary meristem
    c) Lateral meristem
    d) Both a and b
16. **Which is not a accelerated motion:**
    a) uniform velocity
    b) constant velocity
    c) circular motion
    d) both a and b

For question numbers 17-20 two statements are given- one labeled as Assertion (A) and the other labeled as Reason ®. Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:
(a) Both A and R are true, and R is correct explanation of the assertion.
b) Both A and R are true, but R is not the correct explanation of the assertion.

c) A is true, but R is false.
d) A is false, but R is true.

17. Assertion (A) : Tyndall effect can be observed when beam of light passes through a colloidal solution.
Reason (R) : The particles of colloidal solution are very small but can easily scatter a beam of light.

18. Assertion (A) : Lysosomes areknown as cleaner of the cell
Reason (R) : enzymes present in the lysosomes are powerful enough to breakdown all organic materials.

19. Assertion (A) : A sharp axe cut swiftly.
Reason (R) : The effect of the thrust depends on the area on which is acts.

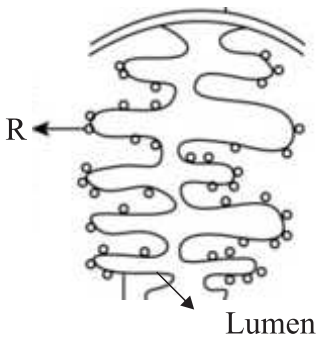
20. Assertion (A) : Weeds are harmful to crop.
Reason (R) : Unwanted plants in the field competes for nutrient with the crop.

SECTION B
Q no. 21 to 26 are very short answer questions

21. During a chemical reaction the temperature in the test tube increased to 303K.
a) Convert this temperature to ^{0}C scale.
b) What will be the physical state of water at this temperature?

22. a) A student write the electronic configuration of an atom having atomic number 16 as : 6,2,8. Is it correct? Explain?
b) How many electrons can be filled L shell of an atom?

23. In the given picture, a organelle is shown which is directly connected to the nucleus.



a) Identify the organelle and the particle R attached to this organelle.
b) White the main function of R

24. While moving on a circular path of 10m. What will be the distance and displacement of an object after completing one round? and why?

25. Which among the following pot will you use to put water in during summer season and why? Earthen or Steel?

26. A girl of mass 35kg runs up a ladder of 12 steps in 10s. If the height of each step is 20 cm, find her power ($g = 10ms^{-2}$)

OR

The work done by a force can either negative or positive. Give one example of each condition.

SECTION C

27. a) How isotopes are different from Isobars?
b) Write two applications of Isotopes.

28. a) Which gases are exchanged at the level of the cell in animal?
b) Why cell is called the structural and functional unit of life?

29. Name the functional unit of nervous system. Also draw its labeled diagram.

OR

Why blood is called connective tissue? What are its components?

30. A bike starting from rest attains a uniform velocity of 36 Km/h in 3 minute. Find : I) The acceleration and (ii). The distance traveled by the bike for attaining this velocity.

OR

A bus travels from destination A to B with a speed of 36km/h and then returns back to A with a speed of 72 km/h. Find
a) Average speed of the bus.
b) Distance traveled by the bus
c) Displacement of the bus

31. The mass of the mars is 6.42×10^{23} kg and that one of its moon is 1.08×10^{15}Kg. If the distance between the mars and its moon is 1.01×10^{5}Km, calculate the force exerted by the mars on the moon.
($G = 6.7 \times 10^{-11}\ Nm^2Kg^{-2}$)

32. a) A sound wave travels at a speed of 346 ms^{-1}. If its wavelength is 1.8 cm, what is the frequency of the wave?
b) Will the above sound is audible? Explain?

33. What are different cropping patterns adopted to maximize benefits? Discuss any three

Section - D

Q no. 34 to 36 are long answer questions

34. i) Write down the chemical formulae of the following compound. Also write the ions (Cation and anions) present in them.
a) Sodium nitrate

b) ammonium sulphate c) aluminium oxide

OR

a) What are Ions? Give examples:

b) State the law of constant proportion. What is the ratio by mass of carbon and oxygen present in carbon dioxide compound?

c) Define Atomicity.

35. During an experiment Reema placed few raisins in a liquid. After some times she observed that size of raisins is increased.

a) What could be the nature / Type of the solution in which these raisins were placed. Explain the reason for this change.

b) What happen if we put these (swollen) raisins in a highly saturated solution of sugar.

OR

Draw a neat labeled diagram of plant cell (label at least six parts)

36. Give reason:

a) In which direction does the passenger fall when a bus accelerates from rest?

b) A fielder pulls his hand back gradually with the moving ball while holding a catch.

c) Which will have greater momentum between a truck or a car moving with same velocity?

SECTION E

Q no. 37 to 39 are case based / data based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. Mixtures are constituted by more than one kind of pure form of matter, known as a substance. Depending upon the nature of the components that form a mixture we can have different types of mixtures i.e. homogeneous and heteogeneous mixtures.

a) A student mixed few drops of egg white in 50ml of water in a test tube.

What type of mixture will be formed inside the test tube.

b) Classify the following as mixture and compound:
Blood, soil, air, water, milk, common salt

c) How will you form a suspension mixture.

OR

c) List two differences between homogeneous and heterogeneous mixtures.

38. During a sport event an athlete run very fast and win the race but just after crossing the finishing line, he got an accident. During medical examination it is found that his leg bone gets fractured and ligament is torn.

Answer the following:

i) What is ligament?

ii) how muscles are attached to the bones.

iii) Is bone a connective tissue, answer on the bases of its structure.

OR

iii) Name a tissue located at the head of the bone which protect them from wearing and tearing. This tissue is also present in the nose and outer ear. Write its two characteristics.

39. Different from of energy can be changed from one form to another, so that the total energy of a system during or after the transformation remains the same. During free fall of an object its potential energy will change into kinetic energy.

A student dropped an object of mass 20kg from a height of 4m and tabulated the energy conversion as show below: ($g=10ms^{-2}$)

answer the following questions :

i) Write the energy transformation in above case.

ii) In the above case when will be the kinetic energy of the object minimum and maximum?

iii) Complete the above table by calculating the values from A to D

OR

iii) What will be the potential and kinetic energy of the above object at a height of 6m?

Height at which object is located m	Potential emergy (E_p=mgh) J	Kinetic energy (E_k=$mv^2/2$) J	$E_P + E_K$ J
4	800	0	800
3	600	A	800
2	B	400	C
1	200	D	800
Just above the ground	0	800	800

PRACTICE PAPER -04

(Class-IX)

Subject - SCIENCE (Code:) 086

Times allowed : 3 Hrs **Maximum Marks : 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 very short questions carrying 02 mark each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer of these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based /case-based units of assessment of 04 marks each with sub parts.

Section - A

Select and write the most appropriate option out of the four option given for each of the questions 1-20. There is no negative mark for incorrect response.

1. Melting point of ice is

a) 73K b)173K

c) 273K d)373 K

2. Which of the following mixtures is not a colloidal solution?

a) Starch solution b) Milk and water

c) Milk of magnesia d) Alum in water

3. Identify the correct statement among the following.

a) Iron sulphide is a compound whereas iron and sulphur are elements.

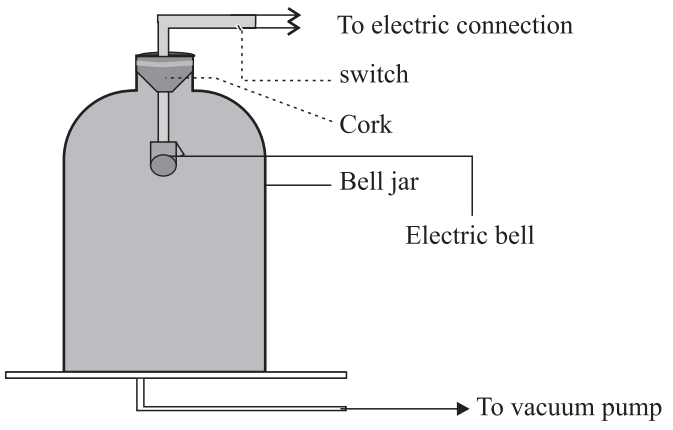
b) Iron sulphide is a mixture whereas iron and sulphur are compounds.

c) Iron, sulphur and iron sulphide are all compounds.

d) Iron and sulphur form a mixture and iron sulphide is an element.

4. **Rupali was asked to distinguish between the correct and incorrect pairs of elements and symbols given in a list. She picked up one of the options are incorrect among the following identify the option.**
   a) Silver-Ag b) Sodium-Na
   c) Potassium -K d) Iron-In
5. **The correct chemical formula of aluminium sulphate is**
   a) $Al(SO_4)_3$ b) $Al_2(SO)_3$
   c) $Al_2(SO_4)_3$ d) $Al_3(SO_4)_2$
6. **Atoms of different elements having same mass number are known as**
   a) Isotopes b)Isomers
   c) Isotones d) Isobars
7. **When a cell is kept inside a hypertonic solution it**
   a) swells up
   b) does not change
   c) shrinks
   d)swells first and then shrinks
8. **What is used to shift a specimen from watch glass to the slide while preparing a temporary slide?**
   a) Needle b) Brush
   c) Blade d) Cover slip
9. **Presence of which chemical in cork cells makes them impervious to water and gases?**
   a) Lignin b) Suberin
   c) Melanin d) Cutin
10. **Which of the following is not a characteristic of skeletal muscle?**
    a) Uninucleated b) Cylindrical shape
    c) Striated d) Voluntary
11. **In uniform circular motion, which of the following does not happen?**
    a) The direction of motion changes at every point.
    b) Magnitude of velocity is constant.
    c) Direction of velocity is tangential to the circular path.
    d) There is no acceleration.
12. **Momentum can be expressed numerically as**
    a) p=ma b) F=ma c) p=mv d) p=F/m

13. **Carefully observe the diagram given below. What is responsible for decreased length of rubber spring?**
    a) Pressure
    b) Buoyancy
    c) Gravity
    d) Inertia
14. **Water is stored in a dam to generate electricity. The stored water possesses**
    a) no energy
    b) electrical energy
    c) kinetic energy
    d) potential energy
15. **To increase loudness of a sound we need to**
    a) increase loudness speed
    b) decrease wavelength
    c) increase amplitude
    d) decrease frequency
16. **Look at the picture given below carefully. What will happen if the vacuum pump does not function properly?**



a) Sound is heard in the beginning but not later
b) Sound is heard later but not in the beginning
c) Sound is heard at regular intervals of time
d) Sound is heard continuously without change

17. Assertion (A) :- Solid carbon dioxide is stored under high pressure.
Reason (R) :- Solid carbon dioxide converts to liquid state gradually and then vaporizes.

18. A :- Adipose tissue regulates body temperature.
R :- It serves as a fat reservoir which acts as an insulator to reduce heat loss

19. A :- A person of mass 50 kg goes up a flight to stairs and by virtue of his position 10 m above the surface ($g = 10ms^{-2}$), he has potential energy of 5000J
R :- Potential energy is found out by product of mass acceleration due to gravity and height.

20. A :- Fertilizers are substances providing nutrients like nitrogen, phosphorus and potassium to crop plants in fields.
R :- They are fully absorbed by plants, are totally safe and do not lead to water pollution.

SECTION B

Q. no. 21 to 26 are very short answer question

21. A solution contains 50 grams of sugar in 350 grams of water, Calculate the concentration in terms of mass by mass percentage of the solution.

22. Prabha was given 2 mixture A and B. One of the mixtures was a colloid and another was a suspension. With the help of a torch how can she analyze and identify them.

23. If an element has Z=13, what would be its valency? Draw its schematic atomic structure showing the distribution of electrons.

OR

If an element has Z=11 and A=23, what would be the number of various sub-atomic particles present in it?

24. Name the two organelles present in the cell that have their own DNA and ribosomes. Mention one important function of each.

25. If an object starts from A, covers a distance of 100m in a linear path and reaches B in 15s, find its speed

OR

A signal traveling at a speed of 300km/s takes one minute to be detected by a radar. How far is its point of origin from the radar?

26. Write the difference between broilers and layers in poultry farming. How are their poultry feeds different?

SECTION C

Q no. 27 to 33 are short answer questions.

27. Describe how change in surface area, temperature and humidity affect the rate of evaporation.

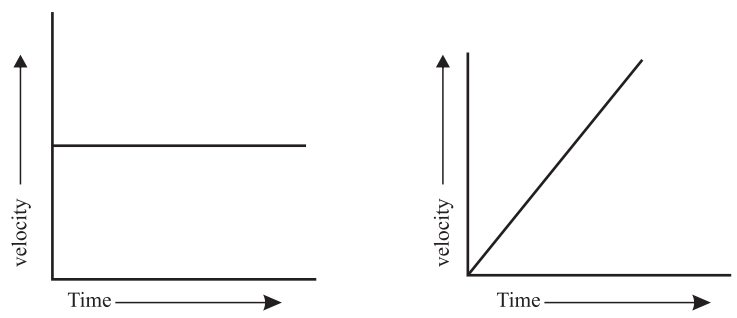
28. Why are lysosomes known as suicide bags of cell?

OR

Why is plasma membrane called a selectively permeable membrane?

29. Distinguish between various types of simple permanent tissues in plants based on their (a) cell wall (b) intercellular spaces (c) function.

30.



Analyse carefully the above velocity time graphs. What do they represent?

31. How is work defined and expressed mathematically? What are the two conditions for work to be done? Is it a scalar or a vector quantity. Why ?

32. Draw graph to represent sound waves having
    a) Low pitch and high pitch
    b) Soft sound and loud sound

33. Describe the three different ways of cropping patterns used by farmers to get maximum benefit.

SECTION D

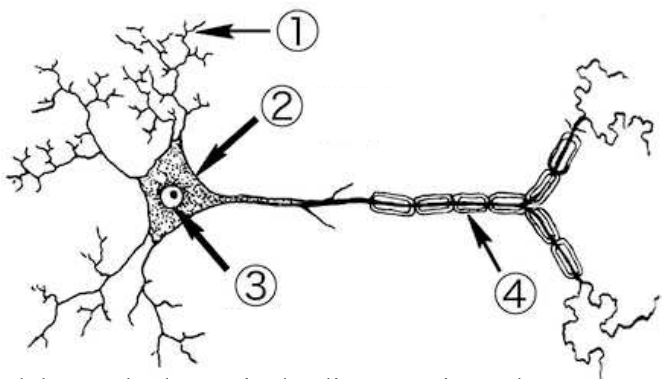
Q. no. 34 to 36 are long answer questions

34. Rutherford designed an experiment which led to the discovery of nucleus in an atom.
    a) For which reason was gold foil selected?
    b) With which high energetic particles was gold foil bombarded?
    c) Mention three observations that were made.

OR

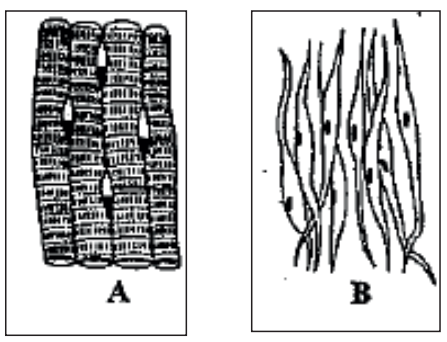
    i) Distinguish between isotopes and isobars using examples.
    ii) Give three uses of isotopes in various fields in daily life.

35



    i) Label the marked parts in the diagram given above.
    ii) In which organs can the above cells be found?
    iii) How do they help in carrying messages in the body?

OR



i) Identify the tissues shows above.
ii) Give any two parts of the body where they are located.
iii) Compare and contrast their characteristics based on the diagrams given above.

36. i) what do you understand by acceleration?
ii) When will you say a body is in uniform or non-uniform acceleration?
iii) A bus decreases its speed from 80 km/h to 60km/h is 5s. Find its acceleration.

OR

i) A person starts from point P, walks 2km and reaches point Q in 30 mins. He then comes back to P again in 20 mins. How much displacement has happened?
ii) Differentiate between speed and velocity.
iii) A car starting from rest moves with a uniform acceleration of $0.1ms^{-2}$ for 2 minutes. Find the speed acquired and the distance traveled.

SECTION E

Q no. 37 to 39 are case based / source based questions. Read the case carefully and answer the questions that follow.

37. Read the passage given below carefully and answer the questions that follow. All the substances around us are made up to basic building blocks known as elements. Two or more elements bond together ot

form compounds. The smallest unit of a compound is a molecule that can be made up of two of more atoms. Compounds are composed of charged species of metals and non-metals. They carry opposite charges. Sometimes a charged species may be formed from a group of atoms.

i) What are the charged species present in compounds known as ?

ii) Which charged species made up of a group of atoms is found in ammonium chloride? Write its chemical formula.

iii) Calculate the molecular mass of the ammonium chloride.

OR

iii) X is a charged species of a metal with valency 2. Y is another charged species of a non-metal with valency 3. What will be the chemical formula of the compound formed by X and Y? Also give a chemical formula of oxide and chloride of X.

38. Read the text carefully and answer the questions.

New cells are formed in organisms by the process of cell division. This helps to replace old, dead or injured cells. Cell division not only helps in growth of a living organism, it also ensures that reproduction happens for propagation of new generations.

i) What are the two main ways of cell division?

ii) In which cells do these two kinds of cell division take place?

iii) Formulate a flow chart to show what happens to chromosome numbers during the above two ways of cell division.

OR

iii) How is chromosome number restored in the organisms that reproduce sexually? Explain using a flowchart.

39. Read the case study given below carefully and answer the questions that follow. Stanley bought a gold ring in the polar region weighing 10g when he went to Antarctica on an expedition. He came back home in Africa that was located near the equatorial region and gifted the ring to his wife. Stanley's wife said that he had been deceived and did not get the full value of money he spent on purchase of the gold ring.

i) What do we understand by the weight of an object?
ii) Why does 'g' vary from place to place on the earth?
iii) Find out the weight of an object on the moon, when its mass is given as 20kg. ($g = 9.8 ms^{-2}$)

OR

iii) What is the mass of an object if it weight is 25N on the moon?

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