

**SMART SKILLS**

**SESSION - 2017-2018**

**CHEMISTRY**

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**SYLLABUS****2017– 18****TERM - I****March –May****Chapter 1 – Matter in our Surroundings**

1. Particle nature of matter

**Activities:** i) Experiments will be performed to show that matter has particulate nature.

- ii) Experiments to show diffusion.

2. States of matter.

**Activities:** i) To show that ink diffuses in water much faster than honey.

- ii) To show that gases are more compressible than liquids.

3. Inter conversion of the states of matter.

**Activities:** i) To study the effect of temperature on the physical state of water.

- ii) To show the process of sublimation.

- iii) To determine the boiling point and melting point of water.

4. Scales of measuring the temperature

5. Evaporation and Sublimation.

**Activities:** i) To show the factors affecting evaporation.

- ii) To show sublimation in camphor.

**Experiments:** To be conducted by the students.

1. To determine the boiling point of water.

2. To determine the melting point of water.

**July****Chapter – 2 Is matter around us pure**

- 1) Pure substance.

- 2) Classification of substances into elements, compounds and mixtures.

**Experiment:** To mix iron and sulphur physically and study its properties and then by heating the mixture study the change in properties.

- 3) Difference between compounds and mixtures.

- 4) Heterogeneous and homogeneous mixtures.

**Activity:** To show and study the difference between homogenous and heterogeneous mixtures.

**August – September :** Chapter continued.

5) True sol., Colloids and suspensions.

**Activity:** To prepare the true solution, colloid and suspension and study their characteristics.

6) Separation of pure substances from a mixture by using different techniques of separation.

a) Sublimation: -

**Activity:** - To separate the constituents of a mixture containing common salt and ammonium chloride.

b) Magnetic separation

**Activity:** - To separate iron filings from a mixture containing sulphur and iron.

c) Sedimentation decantation.

**Activity** – To separate sand particles from muddy water.

d) Filtration.

**Activity** -To obtain clear water from muddy water.

e) Distillation.

**Activity:** - To obtain pure water from common salt solution by Distillation.

f) Centrifugation.

**Activity:** - To separate cream from milk.

g) Chromatography.

**Activity:** - To separate the coloured components of a mixture.

7) Physical change and chemical change

**Experiments:** -

- 1) To separate a mixture and a compound using iron filings and sulphur powder.
- 2) To prepare and distinguish between a true sol. Suspension and colloidal sol on the basis of transparency filtration and stability.
- 3) To separate the components of a mixture of sand, salt and ammonium chloride.

**Experiments:**

- 1) To study the chemical reaction between iron nails and copper sulphate solution.
- 2) To study the reaction between Mg and oxygen
- 3) To study the effect of heat on lead nitrate crystals.
- 4) To study the reaction between sodium sulphate and barium chloride.
- 5) To study the reaction between zinc and sulphuric acid.

**PRACTICAL SYLLABUS**

1. To determine the boiling point of water.
2. To determine the melting point of water.
3. To distinguish between a mixture and a compound using iron filings and sulphur powder.
4. To distinguish between a true sol., Suspension and colloidal sol. on the basis of transparency, filtration and stability.
5. To separate the components of a mixture of sand, salt and ammonium Chloride.
6. To study the reaction between Mg and oxygen
7. To study the effect of heat on lead nitrate crystals.
8. To study the reaction between sodium sulphate and barium chloride.
9. To study the reaction between zinc and sulphuric acid.
10. To study the chemical reaction between iron nails and copper sulphate solution.

**PRACTICAL EXAM FOR 1<sup>st</sup> TERM**

Practical exam would include the recording of the experiments in the practical file and conducting the given experiment in the laboratory during the practical exam, the criteria of marking for which is :

Aim

Apparatus

Theory

Observation

Conclusion

Equation, if applicable

Precautions

- I. Smart skill assignments to be submitted on ruled sheets.
- II. chrome book activity ( An activity on separation of mixtures)
- III. Timely completion and submission of notebooks.
- IV. Class test

**TERM -II****October Chapter – 3 Atoms and Molecules.**

- 1) Law of chemical combination.
- 2) Law of conservation of mass.

**Activity:** - To prove that there is no change in mass during a chemical reaction.

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

**November**

- 3) Dalton's atomic theory.
- 4) Atomic mass.
- 5) Molecule and molecular mass.
- 6) Chemical formulae.
- 7) Mole concept.

**December: -****Chapter 4 – Structure of atom.**

- 1) Nature of matter.
- 2) Discovery of electrons, protons and neutrons.
- 3) Thomson's model of atom.

**January - February : - Chapter continued.**

- 1) Rutherford's alpha ray scattering experiment.
- 2) Rutherford's Model of an atom.

**Activities:** - Charts and films on various discoveries.

- 1) Atomic number.
- 2) Mass number.
- 3) Electron distribution
- 4) Valences.
- 5) Isotopes and isobars.

**Chapter 14 - Natural resources**

- 1) Introduction.
- 2) The breath of life – Air
- 3) Air pollution.
- 4) Water – A wonderful liquid.
- 5) Water pollution.

This chapter would be done in the class as an individual activity the details of which would be informed to the students in January 2017 and a week's time would be given to collect the necessary material.

**PRACTICAL SYLLABUS**

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

**Activity –**

- I. Class tests
- II. Smart skill assignments
- III. Activity using chrome book ( mole concept and formula writing )
- IV. Project presentation on natural resources

**Second Term Total Marks : 80 + 20**

**EXAM PATTERN**

**Term 1 – 80 – Chapter 1 and chapter 2**

**20 – Internal Assessment**

**Term 2 – 80 – Chapter 1 and chapter 2 and part of term 1 syllabus**

**20 – Internal Assessment**

**Chapter No -1**  
**Matter in our surroundings**

**Objective type questions**

1. What are the characteristics of the particles of matter?
  - a) Particles of matter are continuously moving and possess kinetic energy.
  - b) Particles of matter intermix with each other.
  - c) Both (a) and (b)
  - d) Neither (a) and (b)
  
2. Solids have the tendency to maintain shape. This property of solids is termed as
  - a) Fluidity
  - b) Rigidity
  - c) Density
  - d) Ductility
  
3. Conversion of liquid state into solid state is termed as
  - a) Sublimation
  - b) Vaporisation
  - c) Solidification
  - d) Liquefaction
  
4. Three liquids A, B and C have boiling points of  $80^{\circ}\text{C}$ ,  $50^{\circ}\text{C}$  and  $20^{\circ}\text{C}$  respectively, which of these will evaporate quickly
  - a) A
  - b) B
  - c) C
  - d) D
  
5. Which property of matter enables aquatic animals and plants to survive in water?
  - a) Availability of carbon dioxide
  - b) Availability of sea forest
  - c) Diffusion of gases into water
  - d) Due to dissolved oxygen in water
  
6. A gas can be best liquefied by
  - a) increasing the temperature
  - b) increasing the pressure
  - c) increasing the pressure and lowering the temperature
  - d) by using some solvent
  
7. Which of the following energy is absorbed during the change of state of a substance-
  - a. Specific heat
  - b) Latent heat
  - c) Heat capacity
  - d) Heat of the solution



8. What is the relation between Kelvin and Celsius scales temperature?  
a)  $K = 273 - ^\circ C$                       b)  $^\circ C = K - 273$   
c)  $K = 273 \times ^\circ C$                       d)  $K = ^\circ C - 273$
9. Naphthalene balls disappear without leaving solid, which property explains this phenomenon  
a) Diffusion                                      c) Evaporation  
b) Condensation                                d) Sublimation
10. On converting 308K , 329K and 391K to Celsius scale, the correct sequence of temperatures will be  
a)  $33^\circ C, 56^\circ C$  and  $118^\circ C$                       b)  $35^\circ C, 56^\circ C$  and  $119^\circ C$   
c)  $35^\circ C, 56^\circ C$  and  $118^\circ C$                       d)  $56^\circ C, 119^\circ C$  and  $35^\circ C$

**Chapter No -1**  
**Matter in our surroundings**  
**Assignment – 1**

- Q1 Under what conditions can heat be supplied to a substance without increase in the temperature?
- Q2 Why do gases diffuse easily?
- Q3 Where does the sugar go when dissolved in water? What information do you get from the dissolution of sugar in water?
- Q4 Bromine and air take about 15 minutes to diffuse completely but bromine diffuses into vacuum very rapidly. Why is this so?
- Q5 Convert the following temperature to Kelvin scale.  
(a)  $200^{\circ}\text{C}$  (b)  $350^{\circ}\text{C}$  (c)  $-25^{\circ}\text{C}$  (d)  $-175^{\circ}\text{C}$
- Q6 Explain the following :
- i. Cooling is caused by evaporation.
  - ii. We feel uncomfortable when humidity is very high.
  - iii. After a hot shower, your bath mirror is covered with water.
  - iv. Water gets cooled in an earthen pot.
  - v. Honey diffuses very slowly into water.
  - vi. Ice has low density than water.
  - vii. Ice cream appears colder than water at the same temperature.
  - viii. A perfume bottle must not be kept open.
- Q7 Distinguish between :
- (i) Boiling and evaporation
  - (ii) Gas and vapour
- Q8 How will you justify that ice, water and steam are not different substances but different states of the same substance?
- Q9 State two uses of inter conversion of matter.
- Q10 How are gases liquefied? Name a gas which can be solidified and called dry ice.

**Practice questions**

Q1.Explain the following giving reasons:

1) Clothes dry faster on a windy day.

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2) Ice floats over water although it is a solid.

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3) Our palm feels cold when some ice is put on it.

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4) It is easier to remove fresh stains of ink from a cloth than stains caused a few days ago.

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5) We should not wear terylene clothes in summers.

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6) Gas cylinder cannot be half filled.

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7) Food is cooked quickly in a pressure cooker.

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8) On blowing air into balloon, it inflates.

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9) For any physical state, the temperature remains constant during the change of state.

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10) Convert 100 degree Celsius into kelvin and Fahrenheit scale.

### Some interesting information

#### What is the fourth state of matter?

The fourth state of matter is plasma.

Plasma is an ionized gas, a gas into which sufficient energy is provided to free electrons from atoms or molecules and to allow species, ions and electrons, to coexist.

In effect plasma is a cloud of protons, neutrons and electrons where all the electrons have come loose from their respective molecules and atoms, giving the plasma the ability to act as a whole rather than as a bunch of atoms.

Plasmas are the most common state of matter in the universe comprising more than 99% of our visible universe and most of that not visible.

Plasma occurs naturally and makes up the stuff of our sun, the core of stars and occurs in quasars, x-ray beam emitting pulsars, and supernovas.

#### Uses of Plasma

##### **Immunoglobulin's**

Used in the treatment of immunological disorders, such as congenital and acquired primary immune deficiency as well as many diseases that strike healthy people due to some change in the body's defence system.

##### **Coagulation**

Therapies Used in treatment of bleeding disorders, including haemophilia and von Willebrand disease.

##### **Critical Care Products**

Used in critical care settings for treatment of shock and burns, during surgery, and for fluid replacement therapy.

##### **Wound Healing**

Used in surgery and the treatment of wounds to facilitate healing.

##### **Respiratory**

Used in the treatment of alpha<sub>1</sub>-antitrypsin deficiency (A genetic condition resulting in liver and lung failure).

**Answer the following questions by gathering knowledge through books, newspapers or internet.**

- 1) Name a solid metal whose melting point is less than boiling point of water?
- 2) How can you make ice cream without fridge?
- 3) How is snow removed from roads during heavy snow falls at hill station?
- 4) Why your blackboard does look white after using again and again?
- 5) Oxygen is more in atmosphere but goes on decreasing as we go higher in space, why?
- 6) Why should we cover fire pan with plate while cooking? Will it save cooking gas?
- 7) LPG does not have any smell. We find smell when it leaks, why?
- 8) Name the instrument used to measure relative humidity and describe the principle on which it works.
- 9) Find out working of plasma TV. How is it different from LCD and LED TV? Explain. Which of them is best and why?
- 10) Why is ozone found in upper atmosphere and not on earth. Give reason and also give use of ozone. Suggest methods to prevent ozone depletion and consequences if we don't care.

**Reference:-**

**<https://www.youtube.com/watch?v=1PcnCWZP7I0>**

**Chapter No – 2**  
**Is matter around us pure?**

**Objective type questions**

1. Which of the following would be described as pure
  - a) Crystallised salt
  - b) Salt solution
  - c) Rock salt
  - d) All of the above
  
2. A substance made up of single type of particles, having same chemical nature is
  - a) Pure substance
  - b) Impure substance
  - c) Homogeneous mixture
  - d) Heterogeneous mixture
  
3. Which of the following is not an element?
  - a. Graphite
  - b. Germanium
  - c. Silica
  - d. Silicon
  
4. The concentration of a solution indicates
  - a) The quantity of the solute present in a solution.
  - b) The quantity of the impurities present in a solution.
  - c) The quantity of the solvent present in a solution.
  - d) The total quantity of the solution.
  
5. A solution that has dissolved as much solute as it is capable of dissolving at a given temperature is
  - a) Only solution
  - b) Unsaturated solution
  - c) Saturated solution
  - d) Concentrated solution
  
6. Different gases of air can be separated by
  - a) Fractional crystallisation
  - b) Fractional sublimation
  - c) Fractional distillation
  - d) Filtration
  
7. The best method to separate the components of an ink
  - a) Evaporation
  - b) Vaporization
  - c) Distillation
  - d) Sublimation
  
8. Which type of liquids separate out in layers depending on their densities
  - a) Miscible liquids
  - b) Immiscible liquids
  - c) Unsaturated solution
  - d) Saturated liquids
  
9. The elements which exist in liquid state are-
  - a) bromine and iodine
  - b) mercury and chlorine
  - c) iodine and mercury
  - d) bromine and mercury

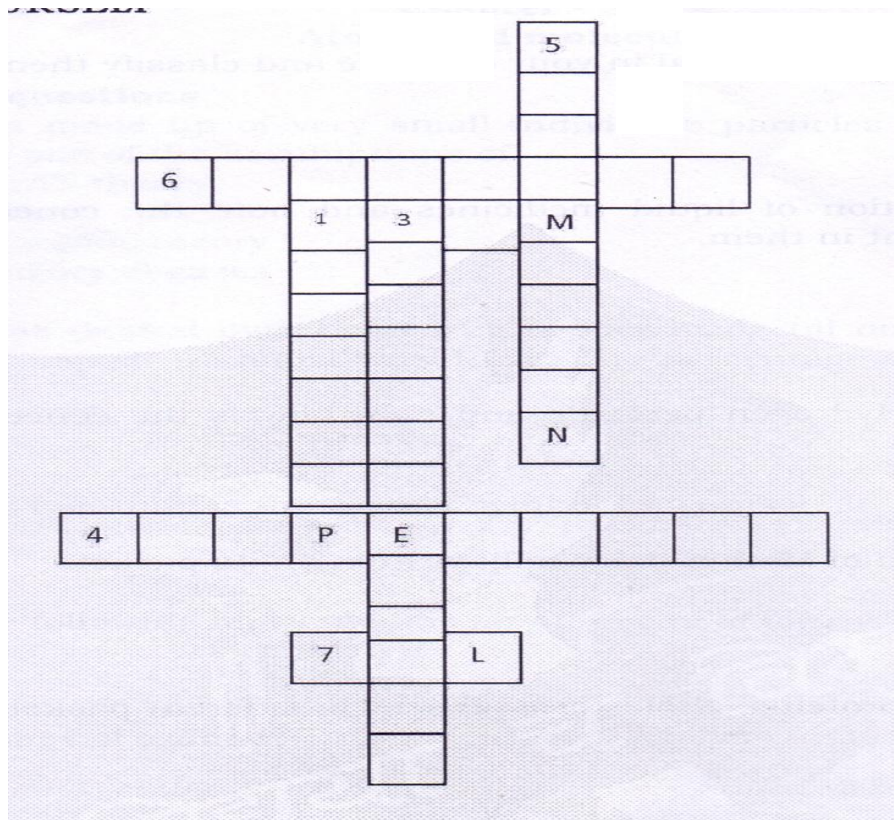
10. Soda water is a solution of carbon dioxide in water. This solution is composed of
- Liquid solute in a gaseous solvent
  - Gaseous solute in a liquid solvent
  - Liquid solute in a liquid solvent
  - Gas in suspended form in liquid.



**chapter No – 2**  
**Is matter around us pure?**

- Q1. Why does solution of sodium chloride not show tyndall effect whereas the mixture of water and milk does ?
- Q2. Sodium metal is a pure substance and so is Sodium chloride, in spite of the fact that Sodium chloride contains two different elements. Explain?
- Q3. Explain why air is considered as a mixture and not a compound? State two differences between a compound and mixtures.
- Q4. 2.5 g of sugar is dissolved in 47.5 g of water .Calculate its concentration as per cent by mass .
- Q5. A solution has been prepared by dissolving 40 g of sugar in 460 g of water. Calculate the mass percentage of this solution.
- Q6. If 25ml of acetone is present in 150ml of its aqueous solution, calculate the concentration of the solution.
- Q7. What is solubility of a salt? Discuss the effect of temperature on the solubility of salt in water and how does temperature and pressure affect the solubility of gases and solids in water.
- Q8. Describe briefly the principle and applications of the techniques used for the separation of the following mixtures
- a) Two immiscible liquids.
  - b) Two miscible liquids whose boiling point differs by more than  $25^{\circ}\text{C}$
  - c) Two miscible liquids whose boiling point differs by less than  $25^{\circ}\text{C}$
- Q9. Distinguish between physical and chemical changes. Can physical and chemical changes occur together? Illustrate your answer.
- Q10. How much water should be added to 15g of salt to obtain 15% solution?

## TRY IT YOURSELF



## Across

1. Smallest particles takes part in a reaction.( 4)
4. Muddy river water (10)
6. Liquid dispersed in liquid (8)
7. Solidified butter(3)

## Down:

2. Solid dispersed in gas(7)
3. Scattering of light by colloidal particles(13)
5. Process of separating sand and iodine(11)

**Activity**

1. List the different solutions used in your daily life and classify them.
2. Note the composition of liquid medicines and note the concentration/ active components present in them.
3. Observe bottle of Hydrogen peroxide and note how the concentration of  $H_2O_2$  expressed is?
- 4 Find the composition of Mother dairy milk written on its packet.
5. Find out % of fats, proteins, cholesterol present in different packets of chips.
6. Many cough syrups and indigestion medicines are suspensions. What are the instructions of use written on the pack?

**Reference:-**

Chromatography- <https://www.youtube.com/watch?v=ZCzgQXGz9Tg>

Crystallisation- <https://www.youtube.com/watch?v=WQdXbf8hUUQ>

Distillation- <https://www.youtube.com/watch?v=mP4Hgui-g6U>

Threshing and winnowing- [https://www.youtube.com/watch?v=zG\\_0t7sIQ-c](https://www.youtube.com/watch?v=zG_0t7sIQ-c)

**MCQ on practical skills:**

Q1. The heat energy needed to convert 1Kg of water into its vapour at its boiling water is called

- (a) Latent heat of vaporisation
- (b) Latent heat of fusion
- (c) Molar heat of fusion
- (d) Specific heat

Q2. Which one does not happen when common salt is added to a piece of ice?

- (a) Ice melts
- (b) Temperature falls below  $0^{\circ}\text{C}$
- (c) Salt dissolves in water
- (d) Temperature increases above  $0^{\circ}\text{C}$

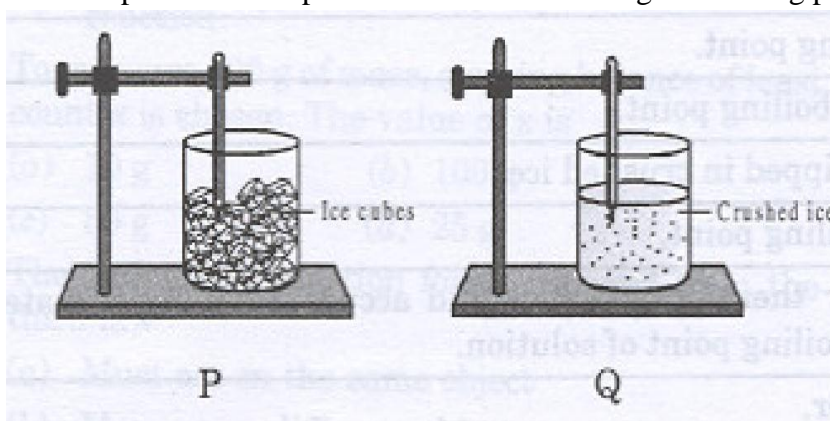
Q3. When we observe the melting of ice, the melting point of ice is a constant temperature at which

- a) both ice and water are present
- b) only water is present
- c) only ice is present
- d) first ice and then only water

Q4. When do ice and water exist together under one atmospheric pressure?

- (a) At  $0^{\circ}\text{C}$
- (b) Below  $0^{\circ}\text{C}$
- (c) Above  $0^{\circ}\text{C}$
- (d) Never

Q5. Which experiment set up is correct for determining the melting point of ice



- a) P
- b) Q
- c) Both P and Q
- d) Neither P and Q

- Q6. Which of the following system is formed when starch is added to hot water?
- (a) Suspension
  - (b) Aerosol
  - (c) True solution
  - (d) Colloid
- Q7. Which of the following is true about milk solution?
- (a) It is a true solution
  - (b) It is a type of colloid
  - (c) It is a suspension
  - (d) It is none of the above
- Q8. Which of the following cannot be separated by the method of sublimation?
- (a) Iodine
  - (b) Common Salt
  - (c) Camphor
  - (d) Ammonium chloride
- Q9. Which one of the following is a pure substance?
- (a) Pure milk
  - (b) Cold drink
  - (c) Carbon dioxide
  - (d) Each one
- Q10. Which of the following is least soluble in water?
- (a) Common salt
  - (b) Starch
  - (c) Cane sugar
  - (d) Potash alum
- Q11. A mixture of iron filings and sulphur is heated in a hard boiling tube, which of the following will be observed?
- a) Mixture sublimes.
  - b) Iron will melt first
  - c) Sulphur will melt first.
  - d) Mixture becomes red hot without melting.
- Q12. Which one of the following will result in the formation of a compound?
- (a) Mixing of iron and sulphur
  - (b) Dissolving alum into water
  - (c) Passing of ammonia gas into water
  - (d) Dissolving sulphur powder in carbon disulphide

Q13. A mixture of iron filings and sulphur powder was taken in a test tube. Then dilute sulphuric acid was added into it. What will you observe?

- (a) Only iron reacts to give out colourless, odourless hydrogen gas.
- (b) Only sulphur reacts to give out colourless  $H_2S$  gas with smell.
- (c) Iron and sulphur will combine to form iron sulphide.
- (d) Both iron and sulphur react with sulphuric acid and both  $H_2$  and  $H_2S$  are evolved.

Q14. Shreya took 10ml of 5% solution of lead nitrate in a conical flask and to it added 10 ml of 5% sodium chloride solution. Which one is the incorrect observation made by her?

- a) An instantaneous reaction takes place.
- b) White precipitate is formed
- c) Total mass of reactants is equal to total mass of products.
- d) Yellow precipitate is formed.

Q15. Barium chloride solution is mixed with sodium sulphate solution. a white insoluble ppt. which is formed is

- a) Barium sulphide.
- b) Barium sulphite.
- c) Barium sulphate.
- d) Barium carbonate.

Q16. Which is not observed when zinc granules are added to dil.  $H_2SO_4$  in a test tube.

- a) Precipitate at the bottom of the test tube.
- b) Gradual decrease in the size of the granules
- c) Heat energy involved in the reaction.
- d) Bubbles of gas escaping from the tube

Q17. When magnet is rolled in the compound of iron and sulphur

- a) Iron particles are attracted towards the magnet.
- b) Iron particles cling to the magnet.
- c) Iron sulphide does not cling to the magnet.
- d) None of these.

Q18. A magnet is repeatedly moved closely over a mixture of iron powder and sulphur powder. which of the following is not observed.

- a) Iron powder is attracted towards the magnet.
- b) Iron powder is left behind
- c) Black powder is left behind.
- d) Iron and sulphur powder are separated.

Q19. Which of the following settles down when allowed to stand undisturbed for some time?

- a) Copper sulphate solution
- b) Salt solution
- c) Muddy water
- d) Sugar solution

Q20. The student sets up the experiment for determining the boiling point as given above the observed reading of boiling point will be

- a) Above  $100^{\circ}\text{C}$
- b) Below  $100^{\circ}\text{C}$
- c) Exact  $100^{\circ}\text{C}$
- d) None of these

**Question bank****First term****(1mark)**

- Q1. A substance has no mass. Can we regard it as matter?
- Q2. Out of water and alcohol which is more volatile?
- Q3. Name a suitable technique to separate salt from ammonium chloride.
- Q4. Define diffusion.
- Q5. Melting of butter in a pan is a physical change. Give reason.
- Q6. Give two examples of metalloids.
- Q7. A solution contains 16g of urea in 120g of the solution. What is the mass by mass percentage of solution.
- Q8. What is the particle size of a colloidal solution?
- Q9. How can we convert a saturated solution into an unsaturated solution ?
- Q10. State one instance where water undergoes a physical change and one in which it undergoes a chemical change.

**(2marks)**

- Q1. How can you support the particulate nature of matter with the help of an experiment involving dissolution of sugar?
- Q2. Define latent heat of fusion.
- Q3. Why does temperature remain constant during melting and boiling?
- Q4. Name the factors which affect evaporation.
- Q5. Why does evaporation cause cooling?
- Q6. Mention two applications of colloids.



Q7. Name two substances that sublime on heating.

Q8. Comment upon the statement that burning of a candle involves both physical and chemical changes.

Q9. After the winters are over we generally keep our woollens with moth balls. These moth balls disappear with time. What type of change is involved in this process.

Q10. Write four differences between a mixture and compound.

**(3 Marks & 5 marks)**

Q1) Give the main points of difference in the three states of matter in the tabulated form.

Q2. Ordinary water boils at  $100^{\circ}\text{C}$ . Can it be boiled at  $95^{\circ}\text{C}$  or  $105^{\circ}\text{C}$ ?

Q3. Two cubes of ice are pressed between the palms, when the pressure is released, the two cubes join together. Explain.

Q4. Describe an activity to show the compressibility of solids, liquids and gases

Q5. What are the characteristics of particles of matter?

Q6. Compare the properties of a true solution, a suspension and a colloidal solution.

Q7. Distinguish between the following

- Physical and chemical changes.
- Compounds and mixtures.
- Homogeneous and heterogeneous solutions.

Q8. How will you account for the following.

- Fresh air cannot be regarded as a pure substance.
- A mixture of ammonium chloride and camphor cannot be separated by sublimation.
- Electrolysis of water is a chemical change.

Q9. Name and explain the technique used to separate the mixture of alcohol and water.

Q10. Draw a flow chart to show the separation of constituents of mixtures containing ammonium chloride, sand and iron filings

Q11. With the help of a labeled diagram write an activity to separate the two immiscible liquids with different densities.

Q12. Explain-

- Evaporation is a surface phenomenon.
- Food is cooked faster in Delhi as compared to Manali
- Compound cannot be separated into its constituents by physical methods.
- Water Vapours have more energy than water.

Q13 Differentiate between distillation and fractional distillation.

Q14) a) 25grams of glucose is dissolved in 100g of water. Find the concentration of the solution.

b) Name the state of matter in which particles just vibrates at a fixed position.

c) Define the phenomenon by which tea cools faster in a saucer.

### Value based questions

Q1. Shelly and her mother went to a shop to buy some cooling equipment for her house to beat the heat. The shopkeeper showed them two types of cooling equipment's- a desert cooler and an all-weather air conditioner. The desert cooler was much cheaper than all-weather air conditioner.

1) As a science student what would you suggest to Shelly's mother to buy? Give two reasons.

Q2. Lalit Jain uses CNG to run his car. He writes regularly about the ill effects of industrial and vehicular gases. Acid rain is caused due to sulphuric acid and nitric acid formation from oxides of sulphur and nitrogen respectively. Aquatic life, vegetation's, marble buildings are affected by acid rain. River water is also affected.

a) Which property of gases makes it possible to fill large volumes of gases in small cylinders? How can we liquefy a gas?

b) Write the full form of CNG and LPG.

c) What values is possessed by Mr. Lalit Jain?

Q3. A little baby was playing in a park with his maid. Suddenly he fell down and got minor injury. Maid applied tincture of iodine on the wound.

a) Why did she apply tincture of iodine on the wound?

b) Name the solute and solvent present in tincture of iodine.

c) Enlist the values shown by the maid.

Academic Session: 2015-16  
First Term Examination  
Subject: Science  
M/3/1

Time Allowed: 3 hours

Maximum Marks: 90

**General Instructions:**

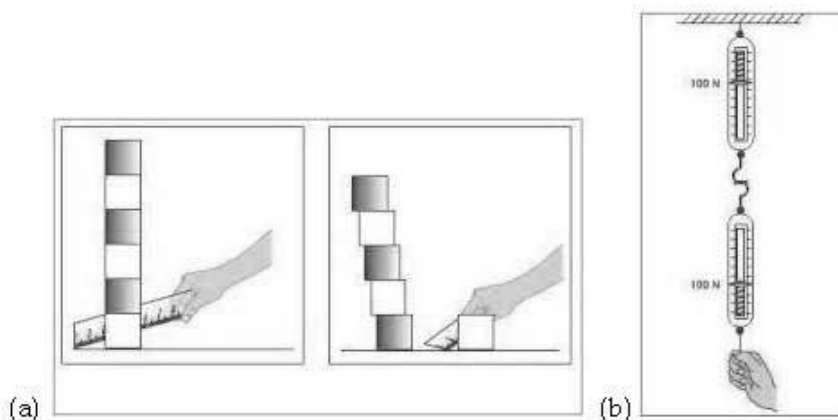
- (i) The question paper comprises of **two Sections, A and B**. You are to attempt all the sections.
- (ii) **All questions are compulsory.**
- (iii) There is no choice in any of the questions.
- (iv) **All questions of Section-A and Section-B** are to be attempted separately.
- (v) Question numbers **1 to 3** in **Section-A** are **one mark** questions. These are to be answered in **one word** or in **one sentence**.
- (vi) Question numbers **4 to 6** in **Section-A** are **two marks** questions. These are to be answered in about **30 words** each.
- (vii) Question numbers **7 to 18** in **Section-A** are **three marks** questions. These are to be answered in about **50 words** each.
- (viii) Question numbers **19 to 24** in **Section-A** are **five marks** questions. These are to be answered in about **70 words** each.
- (ix) Question numbers **25 to 33** in **Section-B** are multiple choice questions based on practical skills. Each question is a **one mark** question. You are to select one most appropriate response out of the four provided to you.
- (x) Question numbers **34 to 36** in section B are **two marks** questions based on practical skills. These are to be answered in about **30 words** each.

**This paper has 6 printed sides.**

**SECTION-A**

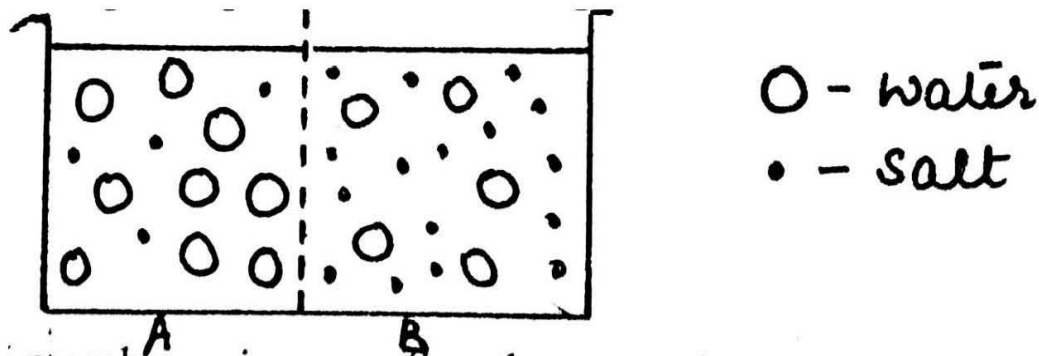
1. Draw the velocity-time graph for (i) uniform velocity (ii) positive acceleration. 1
2. Give an example of motion in which speed of a body is uniform but the body is in accelerated motion. 1
3. What are micronutrients? Give one example. 1
4. How are balanced forces different from unbalanced forces? [give 2 points of difference] 2
5. Why sugar crystals dissolve faster in hot water than in cold water? Define the process involved. 2
6. List two characteristics of cork cells which help them to function as protective tissue. 2

7. An object is dropped from a rooftop. It takes 2s to reach the ground. Find 3
- The velocity with which it strikes the ground
  - Its average velocity
  - The height of the rooftop from the ground  
[Given :  $g = 10\text{m/s}^2$ ].
8. Identify the law applicable in the figures below and explain each scientifically :- 3



9. (a) Define universal gravitational constant. 3  
 (b) How does the force of gravitation between two objects change when the mass of one object is doubled and the distance between the objects is halved?
10. (a) Two sacks of rice X and Y of masses 50 kg each are taken to the South pole and the equator respectively. At which place would the sack weigh more? Justify your answer. 3  
 (b) A ball is thrown vertically upwards with a velocity of 30 m/s. Calculate the total time it takes to return to the surface of the earth. [ Take  $g = 10\text{ m/s}^2$ ]
11. State the Law of conservation of momentum. 3  
 A bullet of mass 10g is fired at a speed of 400m/s from a gun of mass 4kg. What is the recoil velocity of the gun?

12. Give an example of the following mixtures and suggest a suitable method to separate the components of these mixtures 3
- A volatile and a non - volatile component
  - Two immiscible liquids
  - Two volatile components with less difference in their boiling point
13. 3
- How much water must be added to 20 grams of sugar to prepare 20 % mass by mass sugar solution ?
  - State two reasons to justify that water is a compound and not a mixture .
14. With the help of an activity suggest a method to separate a mixture of acetone and water . 3
15. Draw a neat diagram of a plant cell and label the following: 3
- Powerhouse of the cell.
  - Kitchen of the cell.
  - Waste disposal system of the cell.
  - Part which contains cell sap.
16. Observe the given set up and answer the questions:



- What type of membrane is separating the two solutions?
  - Which solution is hypertonic in nature?
  - In which direction will the movement of water happen in the above set up?
17. 3
- What are weeds?
  - Name the methods of weed control.
  - What will happen if weeds are not removed from the crop fields?

18. Give reasons for the following: 3
- Blood is considered a connective tissue.
  - Smooth muscle is also called involuntary muscle.
  - Epidermal cells of the roots bear long hair-like parts.
19. (a) Define the SI unit of force. 5
- (b) How is Newton's first law stated from the mathematical expression of Newton's second law?
- (c) A force of 5N gives a mass  $m_1$  an acceleration of  $10\text{m/s}^2$  and a mass  $m_2$  an acceleration of  $20\text{m/s}^2$ . What will be the acceleration produced if both the masses are tied together?
20. (a) Derive the position-velocity relation graphically. 5
- (b) An aeroplane starts from rest with an acceleration of  $3\text{m/s}^2$  and takes a run for 30s before taking off. What is the minimum length of the runway and with what velocity the plane took off?
21. Give reasons for the following : 5
- Temperature of a solid does not change when it melts.
  - Rate of evaporation of an aqueous solution decreases with increase in humidity .
  - You feel cold when you pour some nail polish remover on your palm.
  - We wear cotton clothes in summers.
  - liquids show the phenomenon of diffusion to more extent than solids
22. A group of students took an old shoe box, covered it with black paper from all the sides. They fixed a source of light at one end of the box by making a hole in it and made another hole on the other side to view the light . They placed a milk sample contained in a beaker in the box . They were amazed to see that the path of light was visible .They tried the same with salt solution but could not trace the path of light 5
- Explain why the path of light was visible in the milk sample. Name the phenomenon involved .
  - Same results were not observed with salt solution . why ?
  - Suggest two more solutions which would show same effect as shown by milk solution.
  - Is milk a homogeneous or heterogeneous mixture. Comment
  - What happens when a saturated solution is (a) cooled and (b) further heated ?
23. a. Define differentiation.
- b. Give two differences between the living simple permanent tissues in plants.
- c. With the help of a diagram, show the location of meristematic tissue in a plant body.

24. a. Explain animal husbandry. 5  
b. Differentiate between milch and draught animals.  
c. Your father bought few fruits from the market and asked everybody to wash it properly before eating. Your sister was in a hurry and hence she ate an apple without washing it.  
i. Why did your father ask to wash the fruits before eating?  
ii. Did your sister do the right thing by not listening to your father?  
iii. Should the government ban pesticides?

## SECTION B

25. A student measured the minimum force to pull a wooden block as  $F_1$  when it was placed on wooden table,  $F_2$  when placed on glass surface and  $F_3$  when placed on a table with sand spread on it. The relationship between the three forces would be 1  
(a)  $F_1 < F_2 < F_3$   
(b)  $F_3 < F_2 < F_1$   
(c)  $F_1 = F_2 = F_3$   
(d)  $F_2 < F_1 < F_3$
26. A student mixes soap solution in water and found the resulting solution to be : 1  
(a) clear and transparent  
(b) opaque  
(c) translucent  
(d) such that the soap solution does not mix but settles down at the bottom
27. When a mixture of iron filings and sulphur powder is reacted with dilute sulphuric acid , it is seen that : 1  
(a) Both iron and sulphur dissolve  
(b) Only iron reacts to give a colourless , odourless gas  
(c) A gas with rotten egg smell is liberated  
(d) No reaction takes place
28. When we add 5ml barium chloride solution to 5ml sodium sulphate solution in a beaker we immediately observe that the reacting mixture : 1  
(a) turns blue  
(b) forms a white precipitate  
(c) forms a yellow precipitate  
(d) turns red

29. For determining melting point of ice , the thermometer should be kept : 1
- (a) with its bulb dipped in crushed ice
  - (b) above the ice
  - (c) in water formed after melting of ice
  - (d) with its bulb dipped in ice cube
30. Teacher gives four solutions separately in test tube A,B,C and D. He has also given a yellowish brown solution and asked to mix a few drops of it in each test tube. The colour of solution B turned blue black. The yellowish brown solution is: 1
- (a) Bromine water.
  - (b) Iodine solution.
  - (c) Litmus solution.
  - (d) A dye solution.
31. To observe cells in an onion peel, we must prepare the slide by mounting: 1
- (a) Crushed pulp of onion.
  - (b) Dry scale leaf.
  - (c) Thin layer of fleshy leaf of onion.
  - (d) None of the above.
32. To observe the cheek cells clearly under a microscope it must be stained with 1
- (a) Methylene blue.
  - (b) Safranin
  - (c) Iodine
  - (d) Potassium permanganate.
33. Raisins selected for the experiment should 1
- (a) Have intact stalks.
  - (b) Be swollen raisins.
  - (c) Be without stalks.
  - (d) None of these.
34. What sequence of steps does a student has to use to separate sand , ammonium chloride and sodium chloride . 2
35. On burning magnesium ribbon , a white ash is obtained that turns a red litmus solution to blue . What is the name and nature of white ash .Support your answer with equations . 2
36. Give the location of parenchyma and sclerenchyma in the plant body. 2



**TERM 2****LANGUAGE OF CHEMISTRY****Smart Notes**

Just like 26 letters make up an entire English language, a few elements are a basis of all chemical reactions. This makes it necessary for us to understand this exciting new language, the language of chemistry.

J.J. Berzelius laid the foundation of language of chemistry in the early 19<sup>th</sup> century. In this, an atom is represented by a symbol, a molecule by a formula and a chemical reaction by a chemical equation. Let us learn more about what each of these terms mean and how are they allotted to a substance to make it meaningful and easy to understand.

**Symbols**

Early scientists used pictures to denote elements (pure substances made up of identical atoms). As more elements were discovered this was not possible. Every element is now denoted by a symbol/ English alphabet. A symbol is the short hand representation of an element. It represents-

An element in particular  
An atom of an element

For ex- the symbol H represents one atom of the element hydrogen.

The symbols were allotted in a systematic manner-

I The first letter of the English name of the element is written in Capital letter. For example

| Name       | Symbol | Name     | Symbol |
|------------|--------|----------|--------|
| Carbon     | C      | Nitrogen | N      |
| Hydrogen   | H      | Oxygen   | O      |
| Fluorine   | F      | Sulphur  | S      |
| Phosphorus | P      | Boron    | B      |

II The first letter of the English name written in Capital followed by another letter from the name written in Small (this becomes necessary when two elements share the same first letter)

For example-

| Name      | Symbol | Name      | Symbol |
|-----------|--------|-----------|--------|
| Helium    | He     | Aluminium | Al     |
| Neon      | Ne     | Calcium   | Ca     |
| Nickel    | Ni     | Chlorine  | Cl     |
| Magnesium | Mg     | Zinc      | Zn     |
| Manganese | Mn     | Barium    | Ba     |

III One or two letters of the Latin name of the elements with the first letter written in Capital and the second written in Small. For example

| Name      | Latin name | Symbol |
|-----------|------------|--------|
| Sodium    | Natrium    | Na     |
| Potassium | Kalium     | K      |

|         |             |    |
|---------|-------------|----|
| Iron    | Ferrum      | Fe |
| Copper  | Cuprum      | Cu |
| Silver  | Argentum    | Ag |
| Gold    | Aurum       | Au |
| Mercury | Hydrargyrum | Hg |
| Tin     | Stannum     | Sn |
| Lead    | Plumbum     | Pb |

### Atomicity

The atomicity is the number of atoms of an element present in a molecule (the molecule may be of an element or a compound).

Some examples of molecules of elements are-

| Atomicity                | Element    | Exists as       |
|--------------------------|------------|-----------------|
| Monoatomic/Atomicity 1   | Helium     | He              |
|                          | Neon       | Ne              |
| Diatomic/atomicity 2     | Hydrogen   | H <sub>2</sub>  |
|                          | Oxygen     | O <sub>2</sub>  |
|                          | Nitrogen   | N <sub>2</sub>  |
|                          | Chlorine   | Cl <sub>2</sub> |
| Triatomic/atomicity 3    | Ozone      | O <sub>3</sub>  |
| Polyatomic/ atomicity >3 | Phosphorus | P <sub>4</sub>  |
|                          | Sulphur    | S <sub>8</sub>  |

Valency : Valency is the combining capacity of an element or a group of atom combined together(radical/ion).

For example- Valency of hydrogen is 1. This means that a hydrogen atom needs to combine with 1 more atom to make a molecule.

Valencies of different elements are different. You will learn in higher classes about how these valencies are derived.

The valencies of some elements and compound radicals(groups of atoms) are given below-

| Positive radicals |         |                              |
|-------------------|---------|------------------------------|
| Name              | Valency | Radical representation       |
| Sodium            | 1       | Na <sup>+</sup>              |
| Potassium         | 1       | K <sup>+</sup>               |
| Hydrogen          | 1       | H <sup>+</sup>               |
| Copper/Cuprous    | 1       | Cu <sup>+</sup>              |
| Ammonium          | 1       | NH <sub>4</sub> <sup>+</sup> |
| Magnesium         | 2       | Mg <sup>2+</sup>             |
| Zinc              | 2       | Zn <sup>2+</sup>             |
| Copper/Cupric     | 2       | Cu <sup>2+</sup>             |
| Iron/Ferrous      | 2       | Fe <sup>2+</sup>             |
| Calcium           | 2       | Ca <sup>2+</sup>             |

|             |   |                  |
|-------------|---|------------------|
| Aluminium   | 3 | $\text{Al}^{3+}$ |
| Iron/Ferric | 3 | $\text{Fe}^{3+}$ |

| Negative radicals |         |                        |
|-------------------|---------|------------------------|
| Name              | Valency | Radical representation |
| Chlorine          | 1       | $\text{Cl}^-$          |
| Fluorine          | 1       | $\text{F}^-$           |
| Bromine           | 1       | $\text{Br}^-$          |
| Iodine            | 1       | $\text{I}^-$           |
| Nitrate           | 1       | $\text{NO}_3^-$        |
| Nitrite           | 1       | $\text{NO}_2^-$        |
| Hydroxide         | 1       | $\text{OH}^-$          |
| Bicarbonate       | 1       | $\text{HCO}_3^-$       |
| Oxygen            | 2       | $\text{O}^{2-}$        |
| Sulphur           | 2       | $\text{S}^{2-}$        |
| Sulphate          | 2       | $\text{SO}_4^{2-}$     |
| Sulphite          | 2       | $\text{SO}_3^{2-}$     |
| Carbonate         | 2       | $\text{CO}_3^{2-}$     |
| Phosphate         | 3       | $\text{PO}_4^{3-}$     |
| Nitrogen          | 3       | $\text{N}^{3-}$        |
| Carbon            | 4       | $\text{C}^4$           |

### Chemical formula

A chemical formula is the short hand representation of a chemical compound which is written using symbols of the elements involved. Let us learn how to deduce the chemical formula of an ionic chemical compound comprising of a positive and a negative radical or a metal and a non metal.

Steps for writing a chemical formula-

I Write the symbols of the radicals side by side, keeping the positive radical on the left and the negative radical on the right.

For example- Na O

II Write the valencies of the radicals on their top right hand side.

For Example-  $\text{Na}^{1+}$   $\text{O}^{2-}$

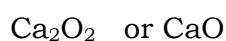
III Cross the valencies and write them as sub-scripts. ( the valency of the negative radical becomes the atomicity of the positive radical and vice versa). The charges on the radicals are NOT written in the chemical formula.

For example-  $\text{Na}^{1+}$   $\text{O}^{2-}$



IV If possible, bring the valencies to the lowest terms.

For example-  $\text{Ca}^{2+}$   $\text{O}^{2-}$



V If a radical has more than element, keep it in a bracket. The atomicity of the individual atoms in such a radical cannot be brought to lowest terms.

For example-  $\text{Ca}^{2+}$   $\text{SO}_4^{2-}$

$\text{Ca}_2(\text{SO}_4)_2$  or  $\text{CaSO}_4$  ( The number 4 here cannot be cancelled). Also, the formula cannot be written as  $\text{Ca}_2\text{S}_2\text{O}_8$

### Steps for naming a chemical compound

I Write the name of the metal/ positive radical (the first alphabet written in capital) followed by the name of the negative radical/non-metal (written in small).

II Note- The names of the metal and radicals remain the same. The name of the non-metal is written endind in “-ide”.

For example-

NaCl- Sodium chloride

NH<sub>4</sub>OH- Ammonium hydroxide

III The names of radicals consisting of more than one atom remains the same. For example- Carbonate (CO<sub>3</sub>), hydroxide (OH<sup>-</sup>)

IV In case of variable valency, the radical with a lower valency ends in **-ous** while the higher valency is written as **-ic**.

For example Ferrous sulphate (Fe<sup>2+</sup>), Ferric chloride (Fe<sup>3+</sup>)

### Chapter - 3 Atoms and molecules

#### Objective type questions

- All matter is made up of very small indivisible particles called atoms. This statement is one of the assumptions of
  - Rutherford's theory
  - Bohr's theory
  - Dalton's atomic theory
  - Kinetic theory of gases
- Hydrogen was passed over heated 2g copper oxide till only copper was left. The mass of copper obtained was 1.6 g. The percentage of oxygen in copper oxide is
  - 80%
  - 60%
  - 40%
  - 20%
- Which of the following is the correct symbol for copper
  - Co
  - Cu
  - Cp
  - Cr
- Which of the following molecule has an atomicity of four
  - H<sub>2</sub>O
  - NH<sub>3</sub>
  - CH<sub>4</sub>
  - CO<sub>2</sub>
- Molecular mass of ozone is
  - 16u
  - 32u
  - 48u
  - 64u
- The correct formula of aluminium sulphate is
  - AlSO<sub>4</sub>
  - Al<sub>2</sub>SO<sub>4</sub>
  - Al<sub>3</sub>(SO<sub>4</sub>)<sub>2</sub>
  - Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>
- The atomicity of Ozone, Sulphur Phosphorus and Argon are respectively
  - 8,3,4,1
  - 1,3,4,8
  - 4,1,8,3
  - 3,8,4,1
- Number of moles of water in 180g of water will be
  - 5
  - 10
  - 15
  - 18
- Which of the following has the same molecular mass as its atomic mass-
  - nitrogen
  - neon
  - oxygen
  - chlorine
- 1 Mole of atoms is
  - Gram atomic mass
  - Both (a) and (b)
  - None of these
  - $6.022 \times 10^{23}$  atoms



**Practice questions-**

Q1. Write down the chemical formulae for the following:

2) Aluminium hydroxide

3) Hydrogen sulphide

4) Ammonium sulphate

5) Calcium phosphate

6) Sodium carbonate

7) Copper (II) sulphate

8) Aluminium (III) chloride

9) Magnesium sulphate

10) Potassium nitrate

- 11) Calcium chloride
- 12) Zinc sulphate
- 13) Calcium oxide
- 14) Magnesium hydroxide
- 15) Sodium oxide

Q2. Calculate the molar mass for the following:

(C- 12 u, H – 1u, N - 14u, O- 16u, P- 31u, Cl - 35.5 u, S - 32 u)

- 1)  $\text{HNO}_3$
- 2)  $\text{CH}_3\text{OH}$
- 3)  $\text{C}_2\text{H}_6$
- 4)  $\text{C}_6\text{H}_{12}\text{O}_6$
- 5)  $\text{H}_3\text{PO}_4$
- 6)  $\text{H}_2\text{SO}_4$

**Assignment -3**

- Q1 Define the following
- |                |                   |
|----------------|-------------------|
| b) Atom        | b) Molecule       |
| c) Atomic mass | d) Molecular mass |
- Q2 What do you understand by a polyatomic ion? Give two examples.
- Q3 Write the formula of limestone, Name the elements present in it.
- Q4 What is the contradiction against Dalton's atomic theory in the formula  $C_{12}H_{22}O_{11}$ .
- Q5 An element M forms the oxide  $M_2O_3$ . What will be the formula of its carbonate?
- Q6 Give the names of any five elements whose names have been derived from Latin. Give their Latin names and symbols.
- Q7 Define Atomic mass unit.
- Q8 What is the difference between  $2N$  and  $N_2$
- Q9 Define law of constant composition. Illustrate the law by taking an example of  $CO_2$ .
- Q10 State and explain the Law of conservation of mass. Give an activity to verify the law.

**Assignment No- 4****Atoms and molecules**

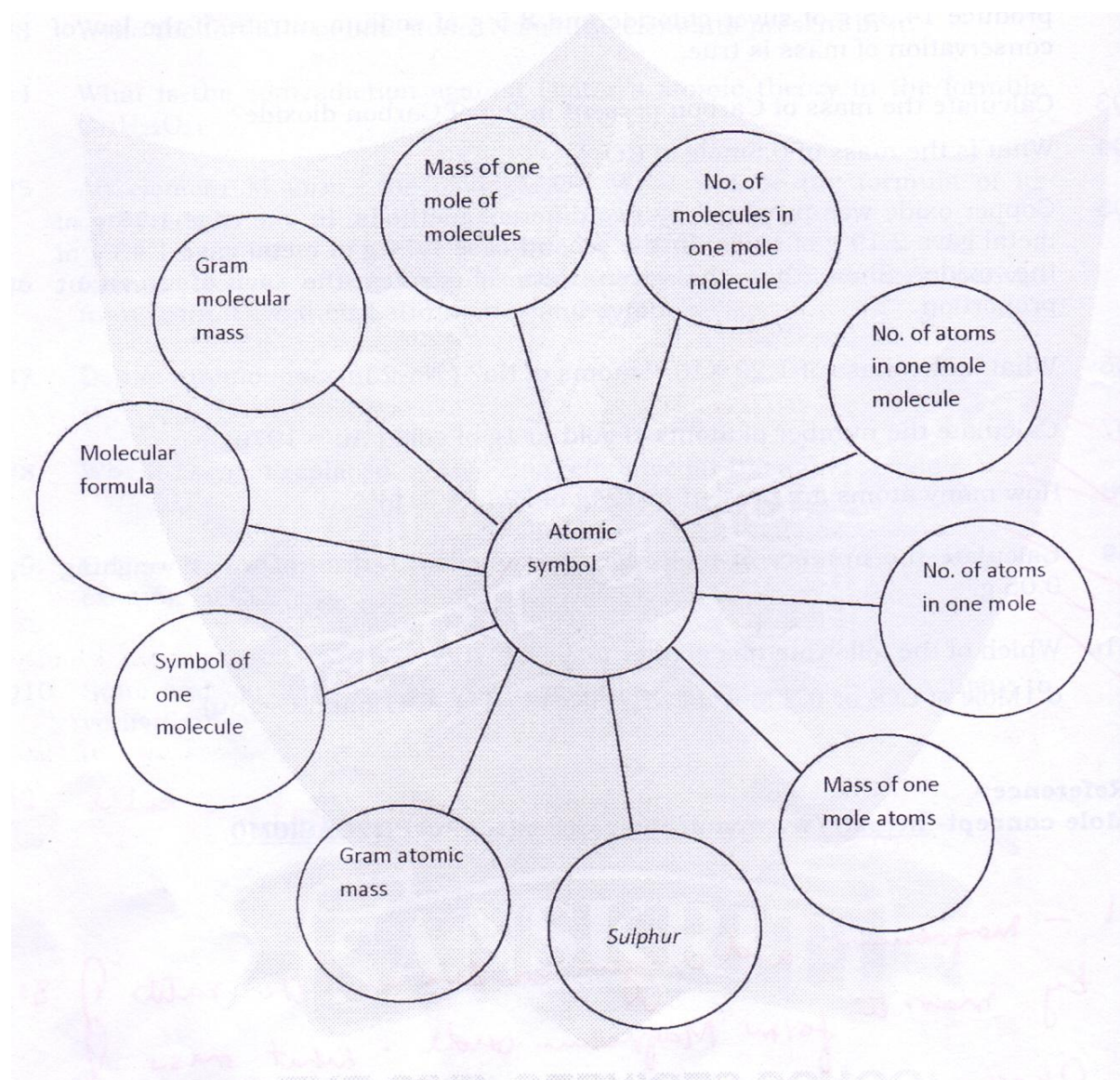
- Q1 Calculate the number of particles in each of the following :
- i) 46 g of Na atoms
  - ii) 8g of O<sub>2</sub> molecule
- Q2 What mass of silver nitrate will react with 5.85 g of sodium chloride to produce 14.35 g of silver chloride and 8.5 g of sodium nitrate, if the law of conservation of mass is true.
- Q3 Calculate the mass of Carbon present in 2 g of Carbon dioxide?
- Q4 What is the mass of 0.5mole of CO<sub>2</sub>?
- Q5 Copper oxide was prepared by two different methods. In one case 1.75 g of metal gave 2.19 g of oxide. In the second case 1.14 g of metal gave 1.43 g of the oxide. Show that the given data illustrates the law of constant proportion.
- Q6 What is the mass of  $1.20 \times 10^{24}$  atoms of Na? ( Na-23u)
- Q7 Which of the following weighs most ?
- i) 32 g of oxygen
  - ii) 2.0 g atoms of nitrogen
  - iii) 0.5 mole of iron
  - iv)  $3.011 \times 10^{23}$  atoms of C
- (Atomic masses : O=16 , N =14 , Fe = 56 , C = 12 )
- Q8 Calculate the number of atoms in each of the following :
- i) 0.08 g of hydrogen
  - iii) 0.008 g of sulphur
- Q9 Calculate the number of molecules contained in a drop of water weighing 0.05 g?
- Q10 Which of the following has greater mass? Justify.  
0.1Mole of CO<sub>2</sub> or 0.2 Mole of NH<sub>3</sub> (N=14, H=1, C=12 and O=16u)

**Reference:-**

Mole concept- <https://www.youtube.com/watch?v=Pft2CASI0M0>

**Mapping worksheet**

One atom of sulphur has atomic mass 32u. Its molecule has eight sulphur atoms. Use this information to complete the following map.



## Try it Yourself

|   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|
| A | M | I | R | O | N | S | E | M | C | L |
| M | L | O | R | N | R | Y | P | N | O | D |
| K | A | N | A | D | C | M | P | D | S | R |
| C | E | A | T | S | C | Y | G | O | T | V |
| A | A | V | O | G | A | D | R | O | F | A |
| O | F | U | M | B | R | Y | A | C | E | L |
| X | O | W | I | Y | B | Z | M | O | L | E |
| Y | S | D | C | K | O | T | M | N | T | N |
| G | I | N | I | D | N | E | C | G | P | C |
| E | R | E | T | D | R | S | T | N | D | Y |
| N | I | H | Y | D | R | O | G | E | N | E |

## CLUES

1. Indian philosopher who named smallest
2. A positively or negatively charged part
3. Number of atoms constituting a molecule (9)
4. Indian scientist who gave number of particles in one mole of any species (8)
5. The relative atomic mass is found with respect to an isotope of this element (6)
6. Unit of molar mass (9)
7. Quantity having mass equal to atomic mass/molecular mass (4)
8. Combining capacity of an element (7)
9. Atomic radii of the element is  $10^{-10}$  m (8)
10. Is a symbol given by Dalton (6)

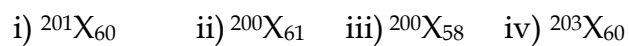
## Chapter - 4

## Structure of Atom

## Objective type questions

- Who discovered electrons?
  - J.J Thomson
  - Goldstein
  - Chadwick
  - Yukawa
- Cathode rays have
  - only mass
  - only charge
  - neither mass nor charge
  - both mass and charge
- Mass number = Atomic number + number of \_\_\_\_\_
  - Neutrons
  - Electrons
  - Protons
  - none of these
- What will be the composition of nucleus of an element with atomic number 6 and mass number 14
  - 6 protons, 6 electrons
  - 6 protons, 6 neutrons
  - 6 protons, 8 neutrons
  - 8 protons, 6 neutrons
- Which of the following is the correct configuration of sodium
  - 2,8
  - 2,8,1
  - 8,2,1
  - 2,9
- In  ${}_{92}\text{U}^{235}$ , The number 92 represents the
  - Atomic number
  - Atomic mass
  - Isobar number
  - Neutron number
- Isotopes differ in the number of
  - Protons
  - Electrons
  - Neutrons
  - All of these
- The atomic number of an element is 15. Hence it will show a valency of
  - 3
  - 5
  - Both 3 and 5
  - Neither 3 or 5

9. The four atomic species can be represented as follows. Out of these, the two species which can be termed as isobars are



a) i) and ii)                      b) ii) and iii)

c) i) and iii)                      d) i) and iv)

10. Four elements W, X, Y and Z contain 8,11,9 and 17 protons per atom respectively. The element which cannot form an anion is most likely to be

a) W                      b) X                      c) Y                      d) Z



**Structure of Atom****Assignment -5**

- 1) Why is an atom neutral in spite of the charged particles present in it?
- 2) State the similarities and dissimilarities between
  - a) an electron and a proton
  - b) a proton and a neutron
- 3) Which experiment established the presence of atomic nucleus? What features of the nucleus were deduced from this experiment?
- 4) Write the electronic configuration of an element X with atomic number 15.
- 5) Why are Bohr's orbits called stationary states?
- 6) Explain why  ${}_6\text{C}^{14}$  and  ${}_7\text{N}^{14}$  are not considered isotopes?
- 7) Why do elements have fractional atomic masses? Explain giving example?
- 8) The atomic number of two elements A and B are 18 and 16 respectively. Which of the two should be chemically more reactive and why?
- 9) What are the numbers of protons, neutrons and electrons present in  ${}^{59}\text{CO}_{27}$  and  ${}^{108}\text{Ag}_{47}$ ?
- 10) What is the relationship between valency and valence electrons in case of metals and non metals. Classify the following as metals or non metals on the basis of their valency. Hydrogen, Magnesium, Carbon, Chlorine and Oxygen?
- 11) The mass number and atomic number of an isotope of uranium are 235 and 92 respectively. Calculate the number of protons and neutrons in the nucleus of the atom?
- 12) Give any two applications of isotopes.
- 13) Naturally occurring copper consists of isotopes of  ${}^{63}\text{Cu}_{29}$  and  ${}^{65}\text{Cu}_{29}$  in the ratio of 8: 3 .Calculate the average atomic weight of copper .
- 14) Given that percentage abundance of the isotope of  ${}^{20}\text{Ne}_{10}$  is 90% and that of the isotope of  ${}^{22}\text{Ne}_{10}$  is 10%, calculate the average atomic mass of neon.
- 15) What is the electronic configuration of  $\text{Na}^+$ ? If atomic number of Na atom is 11 and mass number is 23, what is the atomic number and mass number of  $\text{Na}^+$ ?

- 16) An element has atomic number 16 . How many electrons will be present in K, L and M energy shells of its atom ? What will its electrovalency be ?
- 17) Nucleus of an atom has 5 protons and 6 neutrons . What would be the atomic number , the mass number , the number of electrons and the number of valence electrons per atom of this element .
- 18) If bromine atom is available in the form of , say , two isotopes  $^{79}\text{Br}_{35}$  (49.7% ) and  $^{81}\text{Br}_{35}$  (50.3% ) , calculate the average atomic mass of bromine atom .
- 19) An ion  $\text{M}^{3+}$  contains 10 electrons and 14 neutrons .What is its mass number and atomic number ?
- 20) An ion  $\text{X}^{2-}$  contains 10 electrons and 8 neutrons . What is its mass number and atomic number ?

**Practice Assignment**

Q1. There are 15 protons and 16 neutrons in the nucleus of an atom. Calculate its atomic number and mass number.

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Q2. Justify the statement "the nucleus of an atom is positively charged but the atom as a whole is neutral."

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Q3. Draw the structure of-

a. Magnesium atom

b. Magnesium ion

Q4. Chlorine occurs in nature in two isotopic forms with masses 35u and 37u in the ratio of 3:1. Calculate the average atomic mass of chlorine atom on the basis of this data.

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Q5. Give reasons-

- a. Helium has two valence electrons but its valency is not 2.

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- b. Isotopes of an element have same chemical properties but different physical properties.

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- c. Most of the alpha particles passed straight through the gold foil in Rutherford's experiment.

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Q6. The relative atomic mass of Cu is 63.5u. It exists as two isotopes which are  $^{63}\text{Cu}_{29}$  and  $^{65}\text{Cu}_{29}$ . Calculate the percentage of each present in it?

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Reference-

Cathode ray tube- [www.youtube.com/watch?v=4QAzu6fe8rE](http://www.youtube.com/watch?v=4QAzu6fe8rE)

thomson's model of atom- [www.youtube.com/watch?v=X2uvuSThtuI](http://www.youtube.com/watch?v=X2uvuSThtuI)

Rutherford's experiment- [www.youtube.com/watch?v=XBqHhraf8iE](http://www.youtube.com/watch?v=XBqHhraf8iE)

Game- [http://www.learner.org/interactives/periodic/basics\\_interactive.html](http://www.learner.org/interactives/periodic/basics_interactive.html)

**Chapter 14**  
**Natural resources**

- Q1 List the different components of the environment.
- Q2. What are the type of air movements that form winds and that form clouds.
- Q3.Why does the average temperature of the earth remain constant?
- Q4. Name the acids that form the acid rain?
- Q5. What are the harmful effects of photochemical smog?
- Q6.How does increase in nutrient lead to oxygen depletion in a water body?
- Q7. Write any two adverse effects of acid rain.
- Q8. What are the various causes of water pollution?

**Question bank**  
**Second Term**

**(1Mark)**

Q1. To what type of substances is the law of constant composition applicable?

Q2. Find the formula unit mass of sodium carbonate and sodium bicarbonate .

[ Atomic mass of Na= 23u , H = 1u , C = 12u , O= 16u ]

Q3. What is the atomicity of O<sub>3</sub> and NH<sub>3</sub> ?

Q4. Give the latin name of sodium and potassium.

Q5. Define the term mole.

Q6. An atom consists of one proton and one electron. Has it some residual charge?

Q7. Is the atomic mass of an element its actual mass?

Q8. Define isotopes.

Q9. If Z =4, what would be the valency of the element? Also name the element.

Q10. If K and L shells are completely filled, what will be the name of an element?

**(2 Marks)**

Q1. How many moles are present in 11.5g of sodium?

- Q2. If the valency of carbon is 4 and that of sulphur is 2 write the formula of the compound formed between carbon and sulphur atoms.
- Q3. Give four postulates of Dalton's atomic theory.
- Q4. An element forms an oxide  $B_2O_3$ . Find its valency and write the formula of its chloride.
- Q5. What is atomicity? Give one example of each of monoatomic and diatomic substances.
- Q6. Most of the space in an atom is empty? Justify.
- Q7. Discuss in brief Rutherford model of an atom.
- Q8. Enlist the main postulates of Bohr Theory.
- Q9. An ion  $M^{+2}$  contains 10 electrons and 12 neutrons .What is the atomic number and mass number of the element M? Name the element.
- Q10. Write any four applications of radioisotopes.

**(3 and 5 Marks)**

- Q1. 0.44g of a hydrocarbon on complete combustion with oxygen gave 0.88g of Carbon dioxide and 1.8g of water. Show that the results are in argument with the law of conservation of mass.
- Q2. Write the chemical formulae of  
a) Barium chloride      b) Magnesium sulphate      c) Ammonium nitrate  
d) Potassium dichromate      e) Calcium phosphate
- Q3. The element boron occurs in nature as two isotopes having masses 10u and 11u what are the percentage abundance of these isotopes in a sample of boron having average atomic mass of 10.8u?
- Q4. Draw the electronic configuration of the elements sulphur and nitrogen.
- Q5. Which of the two will be more reactive an element X with atomic number 17 or an element Y with atomic number 16 ? Give reason.
- Q6. Helium atom has 2 electrons in its valence shell but its valency is not 2. Explain.
- Q7. Calculate the number of molecules of sulphur ( $S_8$ ) present in 16 g of solid sulphur. ( S-32u)

Q8 (a) State reason for the following statements :

- (i) Some elements possess fractional atomic mass. Explain with an example
- (ii) Isotopes of an element have similar chemical properties. Explain with an example .

Q9 A compound XH is formed by combination of an element X with hydrogen. Find the valency of element X. State the formula of the compounds formed by combination of:

- (a) X with sulphate ion
- (b) X with oxide ion

Q10 You are given an element

14

X

7

Find out

- (i) Number of protons, electrons and neutrons in 'X'.
- (ii) Valency of 'X'.
- (iii) Electronic Configuration of 'X'. Draw its atomic structure.



**Value based questions**

Q1 An old man and a scientist were talking about a deserted house. The old man was sure that it was haunted by ghosts, but the scientist discarded the view saying no one had ever seen a ghost. The old man was annoyed and challenged the scientist about existence of atoms, sub-atomic particles which also could not be seen.

- Name the three sub-atomic particles and their discoverers.
- Whose viewpoint do you support and why?

Q.2 An activity was conducted in a classroom where students held placards with symbols and valency of the elements separately. Each student held two placards, one with the symbol in the right hand and other with the valency in the left hand.

- Which placards will be required for formation of sodium chloride ( both symbol as well as valency).
- Which qualities are required in the student to perform such a group activity?

Q.3 Two class IX students, Kaveri and Nalin, were asked to take 5.3 g of sodium carbonate and 6g of ethanoic acid to make 2.2g of carbon dioxide, 0.9g of water and 8.2 g of sodium ethanoate. Kaveri followed the instructions but Nalin took the chemicals without measuring their amounts.

- Whose activity do you think will be in agreement with the law of "Conservation of mass"?
- State the law of "Conservation of mass".
- Whose method do you like and why?

Q.4 Raghu and Vansh were performing an activity related to conservation of mass in chemistry lab of their school. They mixed a solution of barium chloride and sodium sulphate. Raghu suggested that as they already knew the amount of both compounds taken by them, they need not to measure the amount of final solution. On the contrary, Vansh insisted to measure the amount of final solution, which had barium sulphate and sodium chloride. Atomic mass of ions:  $\text{Ba}^{2+} = 137$  units,  $\text{Cl}^- = 35.5$  units,  $\text{Na}^+ = 23$  units,  $\text{S}^{2-} = 32$  units,  $\text{O}^{2-} = 16$  units.

- Determine the molecular mass of
  - a) Barium chloride      b) Barium sulphate
  - c) Sodium sulphate    d) Sodium chloride
- Comment on Vansh's Insistence to complete the activity.

Q.5 Ayush is not keeping happy and is unable to focus on studies. His friend Udghosh observed the same and inquired Ayush. Udghosh was told by Ayush that his younger brother is not keeping good health. His neck has swollen. The fact that Ayush's family was not including iodized salt in their diet came to light. Udghosh immediately suggested certain measures and insisted that Ayush's brother must see the doctor without any delay.

- What values are displayed by Udghosh?
- What can be possibly the disease from which Ayush's brother is suffering?
- Name the element whose isotope is used in the treatment for the disease.

**Multiple choice questions on practical skills (TERM 2)****Laws of chemical combination**

- Q1 When 20.8g of barium chloride reacts with 9.8g of sulphuric acid, it produces 7.3g of hydrochloric acid and some amount of barium sulphate equal to
- 11.65g
  - 23.3g
  - 25.5g
  - 30.6g
- Q2 Two elements X and Y combine in gaseous state to form XY in the ratio of 1:35.5 by mass. The mass of Y which combines with 2g of X will be-
- 7.1g
  - 3.55g
  - 71g
  - 35.5g
- Q3 The balancing of chemical equations is based on
- Avogadro's law
  - Law of conservation of mass
  - Law of constant proportion
  - Law of multiple proportion
- Q4. Law of conservation of mass was laid by
- Dalton
  - Proust
  - Lavosier
  - Ritcher
- Q5 18g of water is electrolysed. The weight of oxygen formed will be
- 16g
  - 8g
  - 4g
  - 2g
- Q6 3g of hydrocarbon on combustion in excess of oxygen produces 8.8g of carbon dioxide and 5.4g of water. The amount of oxygen used is-
- 9.2g
  - 10.2g
  - 11.2g
  - 12.2g

- Q7 How much silver nitrate must a student take to carry out a reaction between silver nitrate and 5.85g of common salt to obtain 14.35g of silver chloride and 8.5g of sodium nitrate?
- 16.5g
  - 1g
  - 17g
  - 18g
- Q8 When we react lead nitrate and sodium chloride to get lead chloride and sodium nitrate so as to prove the law of conservation of mass, which of the following is correct-
- Mass of lead nitrate = mass of sodium chloride
  - Mass of lead nitrate + mass of sodium chloride = mass of lead chloride + mass of sodium nitrate
  - Mass of lead chloride + mass of sodium chloride = mass of lead nitrate + mass of sodium nitrate
  - Mass of sodium chloride + mass of sodium nitrate = mass of lead chloride + mass of lead nitrate
- Q9 A sample of pure water, irrespective of the source, contains 88.9% oxygen and 11.11% hydrogen by mass. The data supports
- Law of conservation of mass
  - Law of constant proportion
  - Law of multiple proportion
  - Both a and b
- Q10 Law of definite proportion was proposed by
- John Dalton
  - Ritcher
  - Proust
  - Lavosier
- Q11 28g of nitrogen react completely with 6g of hydrogen. The mass of ammonia formed will be
- 8g
  - 17g
  - 34g
  - 15g

Q12. Laws of conservation of mass holds true and can be verified :

- (a) Only for precipitation reaction carried in open system
- (b) Only for precipitation reaction carried in closed system
- (c) For all types of chemical reaction carried in open system
- (d) For all types of chemical reaction carried in closed system

Q13. A test tube containing 15 g of a solution of sodium sulphate was poured into a beaker containing 15 g of barium chloride solution. The mass of the products obtained in the beaker would be

- a) 15g
- b) 30g
- c) 45g
- d) None of these

Q14. 10g of a solution A was added to a solution of B taken in a beaker. The mass of the products formed was measured as 25g. Determine the mass of solution of B

- b) 35g
- c) 15g
- d) Between 25 to 35 g
- e) More than 35 g

Q15.  $\text{H}_2\text{S}$  gas was prepared through a flask containing 20 g of copper sulphate dissolved in water. After some time, passage of gas was stopped. Contents of the flask weighed 22.5 g. How much  $\text{H}_2\text{S}$  gas was passed through the flask.

- a) 42.5 g
- b) 2.5g
- c) 2.35g
- d) None of the above.