

**INTERNATIONAL INDIAN SCHOOL, RIYADH(K.S.A)**  
**Work Sheet For First Term – (2015-16)**  
**Class: XI Sub: CHEMISTRY**

**Unit 1 SOME BASIC CONCEPTS OF CHEMISTRY**

**1 mark question**

1. What is the number of significant figures in 0.001620?
2. Calculate the percentage of nitrogen in NH<sub>3</sub>.
3. Calculate molecular mass of C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> molecule.
4. State the law of multiple proportion.
5. How many atoms of Calcium are there in 2g of Ca?

**2 marks Question:**

6. Define element, compound and mixture.
7. Define Gay Lussac's law of gaseous volumes. Explain with one suitable example.
8. An organo metallic compound on analysis was found to contain C=64.4% , H=5.5 % and Fe= 29.9 % . Determine its empirical formula. ( At mass of Fe= 56)
9. What volume of 6M HCl and 2MHCl should be mixed to get two litres of 3M HCl?

**3 marks**

10. If 20.0 g of CaCO<sub>3</sub> is treated with 20.0 g of HCl , how many grams of CO<sub>2</sub> can be generated according to the following equation:  
$$\text{CaCO}_3(\text{g}) + 2 \text{HCl} (\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$$
11. Concentrated H<sub>2</sub>SO<sub>4</sub> is 98% weight and has density 1.84 g cm<sup>-3</sup>. What volume of concentrated acid is required to make 5.0 L of 0.50 M H<sub>2</sub>SO<sub>4</sub> solution?

**STRUCTURE OF ATOM**

- Q1. What experiment led to the discovery of electrons? Draw a neat labeled diagram?
- Q2. Write the difference b/w canal rays and cathode rays?
- Q3. Explain with diagram Thomson's Plum pudding model of an atom?
- Q4. Explain Rutherford experiment with neat labeled diagram. Write its observations & conclusions.
- Q5. Explain the draw backs of Rutherford's Experiment.
- Q6. Write the main postulates of Bohr's model of an atom.
- Q7. Explain the first model of an atom based on quantisation of energy.
- Q8. Name two properties of light radiations which indicate its particles like nature.
- Q9. Name two properties of electrons which indicate its wave nature.
- Q10. Explain the following (i) Black – Body radiations (ii) Photo electric effect.
- Q11. Why is photoelectric effect more common in alkali metals?
- Q12. Draw graph between intensity & wavelength for black body radiation at 2 temperatures. T<sub>1</sub> & T<sub>2</sub> (T<sub>2</sub> > T<sub>1</sub>). Interpret graph.
- Q13. What do you mean by 'Quantum'?
- Q14. Define emission spectrum & Absorption spectrum?
- Q15. What is the value of Rydberg's constant in Joules.

## STATES OF MATTER

1. Define standard boiling point. [1]
2. What is surface energy? [1]
3. What is surface tension? What is its S.I unit? [1]
4. How does surface tension change when temperature is raised? [1]
5. Why does viscosity of liquids decrease as the temperature is raised? [2]
6. Why are tyres of automobiles inflated to lesser pressure, in summer than in winter? [1]
7. Why is glycerol highly viscous? [1]
8. What is the effect of temperature on (i) density (ii) vapors pressure of a liquid? [2]
9. Some tiny light hollow spheres are placed in a flask. What would happen to these spheres, if temperature is raised? [1]
10. The boiling points of a liquid rises on increasing pressure. Give reason. [1]
11. Write Van der waal's equation for n moles of a gas. [1]
12. Out of  $\text{NH}_3$  and  $\text{N}_2$ , which will have (i) larger value of 'a' and (ii) larger value of 'b'? [1]
13. What property of molecules of real gases is indicated by van der waal's constant 'a'? [1]
14. Under what conditions do real gases tend to show ideal gas behaviour? [1]
15. How are Van der waal's constants 'a' and 'b' related to the tendency to liquefy? [1]
16. Mention the two assumptions of kinetic theory of gases that do not hold good. [2]
17. When does a gas show ideal behaviour in terms of volume? [1]
18. Define Boyle point. [1]
19. Calculate the pressure exerted by one mole of  $\text{CO}_2$  at 273 k if the Van der waal's constant  $a = 3.592 \text{ dm}^6 \text{ at m mol}^{-1}$ . Assume that the volume occupied by  $\text{CO}_2$  molecules is negligible. [2]
20. What is the value of compressibility factor Z, of a gas when (i) pressure is low, (ii) pressure is high, (iii) at intermediate pressure. [1]
21. Define an ideal gas. [1]
22. Deduce the relation  $pV = nRT$  where R is a constant called universal. [2]
23. At 250C and 760 mm of Hg pressure a gas occupies 600ml volume. What will be its pressure at a height where temperature is 100C and volume of the gas is 640mL.[2]
24. Calculate the volume occupied by 5.0 g of acetylene gas at 500C and 740mm pressure. [2]
25. What is aqueous tension? [1]
26. What is the value of R at STP? [1]
27. Explain how the function  $pV/RT$  can be used to show gases behave non-ideally at high pressure. [2]
28. Molecule A is twice as heavy as the molecule B. which of these has higher kinetic energy at any temperature? [1]
29. Define Boyle's law. [1]
30. Why helium and hydrogen gases not liquefied at room temperature by applying very high pressure? [1]
31. At what temperature will the volume of a gas at 00 c double itself, pressure remaining constant? [2]
32. How is the pressure of a given sample of a gas related to temperature at volume? [1]
33. Define absolute zero temperature. [1]
34. State the law depicting the volume-temperature relationship. [2]
35. State Avogadro's Law. Is the converse of Avogadro's law true? [2]

36. Define Van der waal's forces. [1]
37. Give an example to show dipole-dipole forces. [1]
38. What type of bond exists between 2 H O, HF, NH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub> OH molecule.? [1]
39. Ice has lower density than water. Give reason. [2]
40. Water has maximum density at 40C. Give reason. [2]
41. Define thermal energy. [2]
42. What are the factors responsible for the strength of hydrogen bonds? [2]

### CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PRPERTIES

1. What is the general outer electronic configuration of f – block elements? [1]
2. Why do Na and K have similar properties? [1]
3. Arrange the following elements in the increasing order of metallic character : Si, Be, Mg, Na, P. [1]
4. The atomic number of an element is 16. Determine its position in accordance to its electronic configuration. [2]
5. Why are elements at the extreme left and extreme right the most reactive? [2]
6. Why does the ionization enthalpy gradually decreases in a group? [1]
7. Why does electronegativity value increases across a period and decreases down period? [2]
8. How does electronegativity and non – metallic character related to each other?
9. Define valency. [1]
10. How does valency vary in a group and period in the periodic table? [1]
11. What is the valency of noble gases? [1]
12. How do metals react in a period? [1]
13. How do metals react in a group? [1]
14. How does the reactivity of non–metals changes in a period and group? [2]
15. Give the properties of the oxides in a particular period. [2]
16. What is an amphoteric oxide? [1]
17. Define a neutral oxide. [1]
18. Why does lithium form covalent bond unlike other alkali which forms ionic bond?
19. Predict the position of the element in the periodic table satisfying the electronic configuration (n-1) d<sup>1</sup> ns<sup>2</sup> for n=4, [1]
20. How does atomic size change in a group? [1]
21. Why Li and Mg show resemblance in chemical behaviour? [1]
22. The atomic radius of elements decreases along the period but Neon has highest size among III period element? Why [1]
23. Explain why cations are smaller and anions are larger in radii than their parent atom? [2]
24. Define ionization enthalpy and electron gain enthalpy? [2]
25. How does atomic size change in a group? [2]
26. The size of an atom can be expressed by three radii. Name them. Which of these given the highest, and the lowest value of the atomic radius of an element? [2]
27. Among the elements B, Al, C and Si
  - (a) Which has the highest first ionization enthalpy?
  - (b) Which has the largest atomic radius? [2]
28. Na<sup>+</sup> has higher value of ionization enthalpy than Ne, though both have same electronic configuration.
29. In short give the features of the seven periods. [1]

30. Define electronic configuration. [1]
31. What is the electronic configuration when elements are classified group wise? [1]
32. Give the main features of s-block elements. [2]
33. Give the main features of p-block elements. [2]
34. Give the main features of d-block elements. [2]
35. Give the main features of f-block elements. [2]

### ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES

1. In which C – C bond of CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>Br, the inductive effect is expected to be the least? [1]
2. Can you use potassium in place of sodium for fusing an organic compound in Lassaigne's test? [1]
3. Can you use calcium in place of sodium for fusing an organic compound? [1]
4. 0.395 g of an organic compound by Carius method for the estimation of sulphur gave 0.582 g of BaSO<sub>4</sub>. Calculate the percentage of sulphur in the compound. [3]
5. 0.40g of an organic compound gave 0.3g of Ag Br by Carius method. Find the percentage of bromine in the compound. [3]
6. 0.12g of organic compound containing phosphorus gave 0.22g of Mg<sub>2</sub>P<sub>2</sub>O<sub>7</sub> by the usual analysis. Calculate the percentage of phosphorus in the compound. [3]
7. Ammonia produced when 0.75g of a substance was kjeldahlized, neutralized 30cm<sup>3</sup> of 0.25 N H<sub>2</sub>SO<sub>4</sub>. Calculate the percentage of nitrogen in the compound. [3]
8. Write the chemical composition of the compound formed when ferric chloride is added containing both N and S. [1]
9. Name the common techniques used for purification of organic compounds. [2]
10. Will CCl<sub>4</sub> give white precipitate of AgCl on heating it with AgNO<sub>3</sub>? [2]
11. How can the mixture of kerosene oil and water be separated? [1]
12. Which technique can be used for purification of iodine that contains traces of NaCl? [1]
13. Without using column chromatography, how will you separate a mixture of camphor and benzoic acid? [2]
14. A liquid (1.0g) has three components. Which technique will you employ to separate them? [2]
15. Lassaigne's test is not shown by diazonium salts. Why? [1]
16. Name two methods which can be safely used to purify aniline. [2]
17. What is the basic principle of chromatography? [2]
18. How will you separate a mixture of two organic compounds which have different solubility's in the same solvent? [2]
19. Write resonance structures of CH<sub>2</sub> = CH – CHO. Indicate relative stability of the contributing structure. [2]
20. Write resonance structures of (a) CH<sub>3</sub>COO<sup>-</sup> (b) C<sub>6</sub>H<sub>5</sub>NH<sub>2</sub>. [3]
21. Write the resonance structures of (a) CH<sub>3</sub>NO<sub>2</sub> (b) CH<sub>3</sub>COO<sup>-</sup> [2]
22. Draw the resonance structures for the following compounds  
(a) C<sub>6</sub>H<sub>5</sub>OH (b) C<sub>6</sub>H<sub>5</sub> - C<sup>+</sup>H<sub>2</sub> [3]
23. Explain why is (CH<sub>3</sub>)<sub>3</sub>C<sup>+</sup> more stable than CH<sub>3</sub>CH<sub>2</sub><sup>+</sup> and CH<sub>3</sub><sup>+</sup> is the least stable cation. [2]
24. Show how hyper conjugation occurs in propene molecule. [2]
25. Draw the orbital diagram showing hyperconjugation in ethyl cation [2]
26. Define heterolytic cleavage. [1]
27. Define carbocation. [1]
28. What are the nucleophiles? [1]

29. Giving justification, categories the following molecules or ions as nucleophile or electrophile:  $\text{HS}^-$ ,  $\text{BF}_3$ ,  $\text{C}_2\text{H}_5\text{O}^-$ ,  $(\text{CH}_3)_3\text{N}:$ ,  $\text{Cl}^-$ ,  $\text{CH}_3\text{C}^+=\text{O}$ , [3]
30. Using curved – arrow notation, show the formation of reactive intermediates when the following covalent bond undergo heterolysis cleavage. (a)  $\text{CH}_3 - \text{SCH}_3$ , (b)  $\text{CH}_3 - \text{CN}$ , (c)  $\text{CH}_3 - \text{Cu}$ . [3]
31. Benzyl carbonation is more stable than ethyl carbonation. Justify. [3]
32. Why is  $\text{sp}$  hybrid orbital more electronegative than  $\text{sp}^2$  or  $\text{sp}^3$  hybridized orbitals? [2]
33. What type of hybridization of each carbon atom in the following compounds?  
(a)  $\text{CH}_3\text{Cl}$  (b)  $(\text{CH}_3)_2\text{CO}$  (c)  $\text{CH}_3\text{CN}$  (d)  $\text{CH}_3\text{CH} = \text{CHCN}$ . [4]
34. What is the shape of the following molecules: (a)  $\text{H}_2\text{C}=\text{O}$  (b)  $\text{CH}_3\text{F}$  (c)  $\text{HC}\equiv\text{N}$ . [3]
35. How many  $\sigma$  and  $\pi$  bonds are present in each of the following molecules?  
(a)  $\text{CH}_2=\text{C}=\text{CHCH}_3$ . [1]
36. Why are electrons easily available to the attacking reagents in  $\pi$  – bonds?