

## Final Term Examination 2017-2018

Std. : IX  
Subject : CHEMISTRY

Full Marks : 80  
Time : 2 hrs.+15 mins.

### Section A : 40 Marks Attempt All The Questions

- I. a) Give one word for the following : [5]
- The largest atom in the third period
  - A bond formed by the transfer of electrons
  - Property of a metal by virtue of which it can be beaten into thin sheets
  - The experiment which demonstrates high solubility of hydrogen chloride gas.
  - A formula which shows the simplest whole number ratio
- b) Write fully balanced chemical equation for each of the following reactions : [5]
- Dilute sulphuric acid is added to Iron
  - Heating of Aluminium hydroxide
  - Ammonia is passed over heated lead oxide
  - Water is reacted with Magnesium nitride
  - Hydrogen chloride is reacted with ammonia
- c) Solve the following : [5]
- What volume of oxygen would be required for the complete combustion of 100 litres of ethane according to the following equation ?  
$$2C_2H_6 + 7O_2 \longrightarrow 4CO_2 + 6H_2O$$
  - Calculate the percentage composition of water in  $FeSO_4 \cdot 7H_2O$ .  
[Fe=56, S=32, O=16, H=1]
- d) Choose the appropriate answer : [5]
- An alkaline earth metal is :  
A. Palladium      B. Calcium      C. Lead      D. Copper
  - The number of electrons present in the valence shell of a halogen  
A. 1      B. 2      C. 5      D. 7
  - The molecule containing triple covalent bond is :  
A. Ammonia      B. Methane      C. Water      D. Nitrogen
  - The number of atoms present in one molecule of an element is called its:  
A. Molecular number      B. Atomic number  
C. Avogadro's number      D. Atomicity

- (v) Hydrogen chloride gas is dried by:
- A. Dilute sulphuric acid                      B. Concentrated nitric acid  
C. Quick lime                                      D. Concentrated sulphuric acid.

**e) Identify the gas in each of the following cases : [5]**

- i) A colourless gas which forms an explosive mixture with air and water is the only product of combustion
- (ii) A colourless gas having the smell of burnt Sulphur
- (iii) A colourless gas that turns lead acetate paper black
- (iv) The gas produced when excess ammonia reacts with chlorine
- (v) The gas produced when concentrated sulphuric acid reacts with sodium chloride

**f) Answer the following : [5]**

- i) Name the chief ore of aluminium
- ii) Name the process used to concentrate the above-mentioned ore
- iii) Give cathode and anode reactions involved in the extraction of aluminium from its above mentioned ore.
- iv) Name the process used for the concentration of Zinc blende

**g) Fill in the blanks from the choices given below : [5]**

- i) In covalent compounds, the bond is formed due to the \_\_\_\_\_ (sharing, transfer) of electrons.
- ii) Electrovalent compounds have a \_\_\_\_\_ (low, high) boiling point.
- iii) The ratio of certain mass of a gas or vapour to the mass of same volume of hydrogen is its \_\_\_\_\_ (atomicity / vapour density)
- iv) Across a period, the ionization potential \_\_\_\_\_ (increases, decreases, remains same)
- v) Down the group, electron affinity \_\_\_\_\_ (increases, decreases, remain same)

**h) Arrange as directed: [5]**

- (i)  $Mg^{2+}$ , Mg,  $Mg^+$  (increasing size)
- (ii) Cl, F, I, Br (increasing electronegativity)
- (iii) Na, Rb, Li, Cs (increasing metallic character)
- (iv) B, Li, Be (increasing valency)
- (v) Ar, He, Ne (increasing order of electron shells)

**Section B**  
**Attempt any four**

**Question 2**

- a) Ammonia gas catches fire when burnt in the atmosphere of oxygen. What do you observe when ammonia burns in air ? [1]
- b) Write a balanced equation for the combustion of ammonia in oxygen. [1]
- c) Ammonia is catalytically oxidized with oxygen. [4]
- i) Name the catalyst.
  - ii) Write a balanced chemical equation for the catalytic oxidation of ammonia.
  - iii) Name the industrial process which starts with the catalytic oxidation of ammonia.
  - iv) Name the drying agent used in the laboratory preparation of ammonia.
- d) An element 'X' has 2 electrons in the outermost shell of its atom and combines with an element Y having seven electrons in the outermost shell of its atom. [2]
- i) Write the formula of the compound formed
  - ii) What type of bond is formed between X & Y ?
- i) When the ore of aluminium is treated with sodium hydroxide solution, what happens to : [2]
- A) Aluminium oxide                      B) Iron (III) oxide

**Question 3**

When the substance 'A' is heated, a reddish brown gas is evolved along with a gas which rekindles a glowing wooden splinter. A yellow residue is left in the test tube.

- a) (i) Name the reddish brown gas
- (ii) Name the gas which relights the glowing splinter. [2]
- b) On addition of ammonium hydroxide to the solution of W, a white precipitate is formed which is insoluble in excess of ammonium hydroxide.
- (i) Name the cation present in 'A'.
  - (ii) Name the substance 'A'
  - (iii) Write a balanced equation for the action of heat on substance 'A'. [3]
- b) Answer the following questions with reference to Group 1 of periodic table : [5]
- i) What is the special name given to this group ?
  - ii) Name all the elements of this group.
  - iii) What is the trend of ionisation potential from top to bottom ?
  - iv) Which element is highest electropositive ?
  - v) Which one is radioactive ?

#### Question 4

- a) Amongst the metals Aluminium, zinc and iron, which metal is used for : [3]
- protecting iron from rusting
  - making thin foils for packaging industry
  - the construction of machinery
- b) With reference to the industrial preparation of ammonia, answer the following questions : [4]
- Name the industrial method.
  - Name the catalyst used.
  - Write balanced chemical reaction for ans 4(b)(i)
  - What is the role of promoter in this reaction?
- c) Write the formula of the following compounds : [3]
- Aluminium hydroxide
  - Potassium permanganate
  - Sodium meta aluminate

#### Question 5

- a) Identify the salts insoluble in water : [3]
- Barium sulphate, Silver nitrate, Lead sulphate, Aluminium sulphate, Ferrous sulphide, Mercury (II) sulphate.
- b) A compound X has the following percentage composition: Carbon = 26.7%, oxygen = 71.1% and hydrogen = 2.2%
- Determine the empirical formula.
  - Determine the molecular formula of X, if its relative molecular weight is 90. [4]
- [C=12, O=16, H=1]
- c) State your observations when small amount of Ammonium hydroxide is added to a solution containing
- Ferrous ions
  - Zinc ions
  - Copper ions
- [3]

#### Question 6

- a) What do you observe when : [2]
- Hydrochloric acid is added to methyl orange
  - Ammonia is passed through hot copper (II) oxide
- b) Name the positive ion formed when ammonia is mixed with water. Draw the structure of the ion and state the type of bond present in it. [4]
- c) State 2 difference between Roasting and Calcination. [2]
- d) 450cm<sup>3</sup> of nitrogen monoxide and 200 cm<sup>3</sup> of oxygen are mixed together and ignited. Calculate the composition of resulting mixture.  $2\text{NO} + \text{O}_2 \longrightarrow 2\text{NO}_2$  [2]

### Question 7

- a) With respect to the extraction of Aluminium answer the following : [2]
- The anode is replaced periodically. Why ?
  - Coke is sprinkled over the electrolyte. Give reasons.
- b) In the laboratory preparation of HCl : [3]
- Why is concentrated nitric acid not used ?
  - How is HCl gas collected? Give reasons.
  - Why is the temperature maintained below  $200^{\circ}\text{C}$  ?
- c) In the laboratory preparation of Ammonia : [3]
- Explain why a higher ratio of calcium hydroxide used.
  - The flask in which the reaction occurs is kept inclined. Why ?
  - Why is sodium hydroxide not used for the above purpose ?
- d) State the composition of Brass and Solder. [2]