

# MODEL TEST PAPER – 12 (SOLVED)

[Time : 1½ hours]

[M. Marks : 80]

## SECTION I (40 MARKS)

*Compulsory : Attempt all questions from this section.*

### Question 1.

(a) Choose the most appropriate answer.

- (i) The atoms of elements of a same group of the periodic table have :
- A. the same number of protons.                      B. the same number of electrons.  
C. the same number of neutrons.                      D. the same number of valence electrons.
- (ii) Amongst the elements aluminium, sodium and magnesium of the same period, the atomic volume of :
- A. all of them is same.                      B. aluminium has the smallest volume.  
C. sodium has the smallest volume.                      D. magnesium has the smallest volume.
- (iii) The elements with the highest electronegativity in group 17 is
- A. Chlorine                      B. Iodine                      C. Fluorine                      D. Bromine
- (iv) Which of the following properties generally decrease along a period :
- A. ionisation energy                      B. electron affinity                      C. metallic character                      D. valency
- (v) Which of the following hydroxides is most basic.
- A.  $\text{Be}(\text{OH})_2$                       B.  $\text{Mg}(\text{OH})_2$                       C.  $\text{Ca}(\text{OH})_2$                       D.  $\text{Ba}(\text{OH})_2$
- (vi) The molecular formula of chloroform is :
- A.  $\text{CH}_3\text{Cl}$                       B.  $\text{CH}_2\text{Cl}_2$                       C.  $\text{CHCl}_3$                       D.  $\text{CCl}_3$
- (vii) When 1,2 dibromoethane is warmed with zinc the gas liberated is :
- A. Ethyne                      B. Ethene                      C. Ethane                      D. Hydrogen
- (viii) Dilute sulphuric acid and dilute hydrochloric acid are colourless solutions. They can be distinguished by adding to them :
- A.  $\text{ZnCl}_2$  solution                      B.  $\text{Na}_2\text{CO}_3$  solution  
C.  $\text{BaCl}_2$  solution                      D.  $\text{CH}_3\text{COONa}$  solution
- (ix) On heating strongly pure nitric acid decomposes to :
- A.  $\text{H}_2\text{O}$  and  $\text{NO}_2$                       B.  $\text{H}_2\text{O}$ ,  $\text{NO}_2$  and  $\text{O}_2$   
C.  $\text{H}_2\text{O}$ ,  $\text{NO}$  and  $\text{O}_2$                       D.  $\text{NO}_2$  and  $\text{O}_2$ .
- (x) The acid commonly employed on the surface of a metal before soldering or welding is :
- A. conc.  $\text{H}_2\text{SO}_4$                       B. conc.  $\text{HNO}_3$                       C. conc.  $\text{CH}_3\text{COOH}$                       D. conc.  $\text{HCl}$ .

[10]

(b) Write fully balanced equations for the following reactions :

- (i) Carbon and hot concentrated nitric acid.  
(ii) Action of heat on silver(I) nitrate.  
(iii) Action of hydrogen sulphide gas on zinc nitrate solution.  
(iv) Burning of iron pyrites ( $\text{FeS}_2$ ) in air.  
(v) Action of carbon monoxide with iron (III) oxide.

[5]

(c) (i) State Avogadro's law.

[1]

(ii) State two applications of Avogadro's law.

[2]

- (iii)  $2.24 \text{ dm}^3$  of dry ammonia gas contains  $6 \times 10^{22}$  molecules at S.T.P.  
Calculate the number of molecules in  $56 \text{ cm}^3$  of dry ammonia at S.T.P. [2]

- (d) The questions from (i) to (v) refer to the following solutions tested A to F. [2]
- |                             |                    |                         |
|-----------------------------|--------------------|-------------------------|
| A. Dilute hydrochloric acid | B. Zinc sulphate   | C. Ferrous sulphate     |
| D. Ammonium chloride        | E. Sodium chloride | F. Copper (II) sulphate |
- (i) Which two solutions give white precipitate with silver nitrate solution?  
(ii) Which two solutions will form white precipitate with lead acetate solution?  
(iii) Which solution will form reddish deposit when treated with zinc metal?  
(iv) Which solution will liberate nitrogen gas when warmed with sodium nitrite?  
(v) Which solution will form dirty green precipitate with sodium hydroxide solution? [5]

- (e) (i) Name the process in the concentration of ore of  
(1) aluminium oxide (2) zinc blende  
(ii) Fill in the blank spaces :  
(1) The aluminium metal is discharged at \_\_\_\_\_ during the electrolysis of a fused mixture of cryolite and alumina.  
(2) The zinc metal is used in the \_\_\_\_\_ of iron sheets.  
(iii) Write fully balanced equation for the reduction of concentrated and roasted ore of zinc. [5]

- (f) From the list of chemicals given below select one chemical at a time for the descriptions given from (i) to (v)

A. $\text{SO}_2$	B. $\text{CaO}$	C. $\text{H}_2\text{SO}_4$	D. $\text{ZnO}$	E. $\text{NaOH}$
(i) An acidic oxide.	(ii) An alkali.	(iii) An amphoteric oxide.		
(iv) An oxy-acid.	(v) A basic oxide.			

[5]

- (g) Write chemical equations when : [5]
- (i) Ammonia gas burns in the atmosphere of oxygen.  
(ii) Manganese dioxide is heated with conc HCl.  
(iii) Ethyl alcohol is treated with sodium.  
(iv) Ammonia gas passed over heated copper (II) oxide.  
(v) Ethyne gas is burnt in air.

**SECTION II (40 MARKS)**

Answer any four questions from this section.

**Question 2.**

- (a) Write the structural formula of : [3]
- |             |              |                     |
|-------------|--------------|---------------------|
| (i) Propyne | (2) Propanol | (3) Propanoic acid. |
|-------------|--------------|---------------------|
- (b) By writing an equation, explain how ethanol is prepared from molasses? [4]
- (c) Write chemical equations for the action of : [3]
- (i) Ethanoic acid on ethanol  
(ii) Burning of ethane in excess of air.  
(iii) Action of ethyne on ammoniacal silver nitrate.

**Question 3.**

(a) What is observed when :

- (i) A moist blue litmus paper is taken in the jar of HCl gas.
- (ii) Ammonia gas is passed through copper (II) nitrate solution.
- (iii) Barium chloride solution is added to sodium sulphite solution. [3]

(b) The preparation of lead carbonate from lead oxide is a two step process as lead carbonate cannot be prepared by adding dilute hydrochloric acid to lead oxide.

- (i) What is the first step required to prepare lead carbonate from lead oxide.
- (ii) Write an equation for the reaction that will take place when the first step is carried out.
- (iii) Write an equation for the reaction of second step in order to prepare lead carbonate. [3]

(c) Define or explain the following terms, giving at least one example.

- (i) normal salt
- (ii) basic salt.
- (iii) acidic salt
- (iv) double salt. [4]

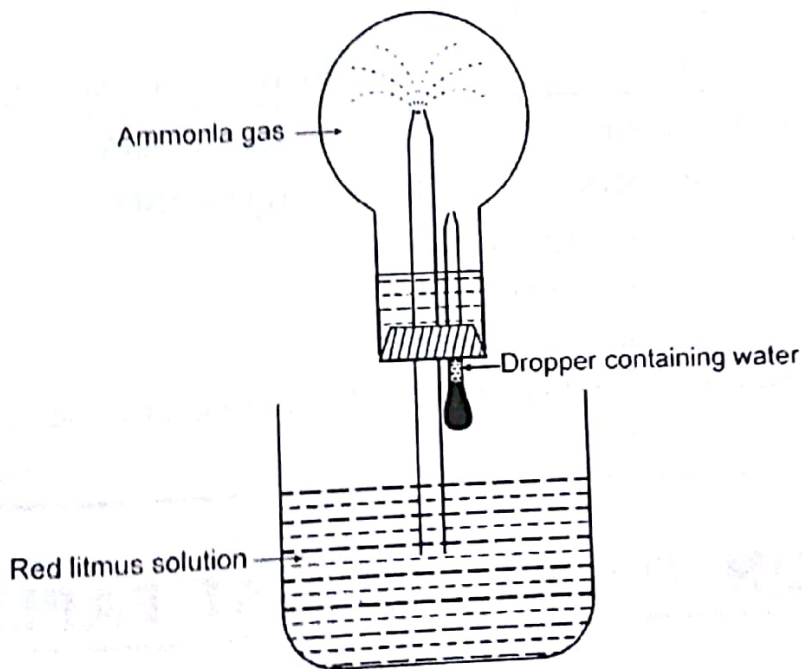
**Question 4.**

- (a) (i) Why do most of the elements tend to form ions?
- (ii) What kind of elements form cations?
- (iii) Give two examples with ionic equations of the elements which form cations.
- (iv) When an element forms a cation does it get oxidised or reduced? [4]

- (b) (i) Lead bromide in solid state is bad conductor of electricity. However, when in fused state conducts electricity. Explain.
- (ii) State the name of process when fused lead bromide conducts electricity. [3]

- (c) (i) Why is hydrogen ion called proton?
- (ii) State the name of two properties which justify that carbon tetrachloride is a covalent compound. [3]

**Question 5.**



- (a) (i) State the name of experiment illustrated by the diagram.
- (ii) Which property of ammonia is demonstrated by the experiment?
- (iii) State the colour of litmus solution which enters the flask. [3]

(b) Fill in the blank spaces :

A pure mixture of two parts of sulphur dioxide gas and one part of oxygen gas by volume is passed over heated \_\_\_\_\_ (1) maintained at 450°C when an \_\_\_\_\_ (2) reaction takes place with the formation of sulphur trioxide gas. The sulphur trioxide gas is directly absorbed in concentrated sulphuric acid so as to form \_\_\_\_\_ (3). The product so formed is mixed with calculated amount of water so as to obtain concentrated \_\_\_\_\_ (4). [4]

(c) (i) Write chemical equations when :

(1) Dilute sulphuric acid is added excess of potassium hydroxide solution.

(2) Ammonia gas is treated with excess of chlorine gas.

(ii) How is sulphuric acid important for automobile industry? [3]

### Question 6.

(a) Write equations for the reaction of ethanoic acid on the following :

(i) Sodium bicarbonate    (ii) Sodium hydroxide    (iii) Magnesium    (iv) Ethanol [4]

(b) How will you convert ethane into acetaldehyde? [3]

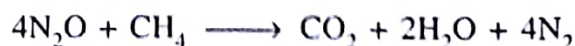
(c) (i) What is steel?

(ii) Name the process which is used to convert iron into steel.

(iii) Name the most impure form of iron obtained commercially. [3]

### Question 7.

(a) The reaction given below takes place only in gaseous state.



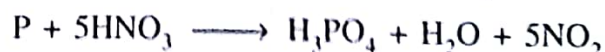
If all volumes are measured at the same temperature and pressure, calculate the volume of nitrogen formed when 250 cm<sup>3</sup> of methane reacts completely. [3]

(b) A gas cylinder contains  $2.8 \times 10^{24}$  molecules of nitrogen gas. If Avogadro's number is  $6 \times 10^{23}$  and atomic mass of nitrogen is 14, calculate :

(1) mass of nitrogen in grams.

(2) volume of nitrogen at S.T.P. in dm<sup>3</sup>. [2]

(c) Phosphorus react with concentrated nitric acid on warming as under :



If 9.3 g of phosphorus reacts completely, calculate :

(i) mass of phosphoric acid formed.

(ii) mass of nitric acid used.

(iii) volume of nitrogen dioxide produced at 760 mm of mercury and 273 K.

[P = 31, H = 1, N = 14 and O = 16] [5]