

Chemistry – Mock Test Paper

[Time: $1\frac{1}{2}$ hrs]

[M. Marks : 80]

Answers to this paper must be written on the paper provided separately.

You will not be allowed to write during the first 15 minutes.

This time is to be spent in reading the Question Paper.

The time given at the head of this paper is the time allowed for writing the answers.

Section I is compulsory. Attempt any **four** questions from **Section II**.

Section I (40 Marks)

Attempt all questions from this section

Question 1.

(a) Choose the most appropriate answer.

- (i) The element with largest size in second period is :
A. Lithium B. Oxygen C. Fluorine D. Carbon
- (ii) Which is the element which belongs to group 13 from :
A. Beryllium B. Boron C. Aluminium D. Carbon.
- (iii) The most strong alkali is
A. Lithium hydroxide B. Potassium hydroxide
C. Sodium hydroxide D. Rubidium hydroxide
- (iv) Lanthanides is a group of elements outside the Periodic Table having atomic number from
A. 57 to 71 B. 89 to 103 C. 72 to 86 D. 104 to 118
- (v) The elements with lowest first ionisation energy is
A. Sodium B. Caesium C. Barium D. Magnesium
- (vi) When equal volumes of hydrogen gas and chlorine gas are exposed to diffused sunlight the reaction :
A. does not take place B. takes place at moderate speed
C. is explosive in nature D. none of the above.
- (vii) In laboratory ammonia gas prepared by heating a mixture of :
A. NH_4Cl and Ca(OH)_2 B. $(\text{NH}_4)_2\text{SO}_4$ and Ca(OH)_2
C. NH_4NO_3 and KOH D. NH_4NO_3 and Ca(OH)_2
- (viii) The compound which will liberate carbon dioxide on treating with dilute sulphuric acid is :
A. MgCl_2 B. Na_2SO_3 C. Na_2CO_3 D. Na_2SO_4
- (ix) Which is not a member of alkanoic series?
A. HCOOH B. $\text{C}_4\text{H}_9\text{COOH}$ C. HCHO D. CH_3COOH
- (x) Ethyne can be converted into ethyne ozonide by treating with :
A. Hydrogen peroxide B. Ozone
C. Oxygen D. Conc. HNO_3

[10]

- (b) (i) Define relative molecular mass of a compound. [1]
 (ii) (1) How is the molecular mass related to its vapour density? [1]
 (2) Calculate the vapour density of butane gas. [C = 12, H = 1]. [2]
 (3) If the g-atomic mass of an element is W and Avogadro's number is N, write an expression for the weight of one atom of the element. [1]
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- (c) (i) Give an example in each case of a substance which contains :
 (1) molecules only (2) both ions and molecules. [2]
 (ii) What do you understand by the term electrolyte. [1]
 (iii) Fill in the blank spaces :
 To electroplate an article with silver requires an _____ which must be solution containing _____ ions. [2]
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- (d) The questions (i) to (v) refer to the following solutions listed from A to F.
 A. Potassium hydroxide solution B. Dilute hydrochloric acid
 C. Sodium iodide solution D. $\text{Fe}_2(\text{SO}_4)_3$ solution
 E. Sodium sulphite solution F. Lead acetate solution.
 (i) Which two solutions on mixing form a yellow precipitate?
 (ii) Which solution liberates hydrogen on boiling with aluminium powder?
 (iii) Which solution will liberate sulphur dioxide gas on treating with dilute sulphuric acid?
 (iv) Which solution will form reddish brown precipitate on treating with ammonium hydroxide solution?
 (v) Which solution is likely to have pH above 12? [5]
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- (e) (i) Lead (II) oxide (ii) Copper (II) oxide (iii) Magnesium oxide
 Amongst the list of oxides given above name the oxide :
 (1) Which is not reduced by hydrogen?
 (2) Which is reduced with the maximum ease with hydrogen?
 (ii) Write balanced equations for the reduction of :
 (1) Lead (II) oxide with hydrogen (2) Copper (II) oxide with coke
 (3) Iron (III) oxide with carbon monoxide. [5]
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- (f) Match the descriptions (i) to (v) with appropriate terms from the list A to E.
 A. Annealing B. Galvanising C. Bessemerisation
 D. Bleaching E. Atomic mass F. Electrolysis.
 (i) The process of removing vegetable colouring matter with sulphur dioxide or chlorine.
 (ii) The process of mass conversion of iron into steel.
 (iii) The process by which a chemical reaction takes place with decomposition of electrolyte due to the passage of electric current.
 (iv) Cooling the hardened steel slowly at controlled temperature.
 (v) The number of times an atom of an element is heavier than $\frac{1}{12}$ th of carbon isotope $^{12}_6\text{C}$. [5]
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- (g) (i) Name a gas which forms a black precipitate when passed through lead nitrate solution.
(ii) A gas which on dissolving in water forms an alkaline solution.
(iii) A gas which relights a glowing splint, but is not oxygen.
(iv) A gas which contains oxygen in its molecule, but is a reducing agent.
(v) A gas used for reducing ferric oxide in blast furnace.

[5]

Section II (40 Marks)

Attempt all **four** questions from this section

Question 2.

(a) With pentane as an example explain what do you understand by the following terms :

- (i) Molecular formula (ii) Condensed formula (iii) Structural formula [3]

(b) Write equations for the laboratory preparation of :

- (i) Ethanol from bromoethane (ii) Ethyne from 1, 1, 2, 2-tetra bromoethane
(iii) 1, 1 dibromoethane from ethyne [3]

(c) (i) How is ethyne gas prepared from calcium carbide?

- (ii) How does ethyne gas react with (i) excess of chlorine, (ii) Excess of O_2 . [4]

Question 3.

(a) What is observed when :

- (i) sodium hydroxide solution is added first in small amount and then in excess in zinc sulphate solution?
(ii) ethane gas is passed through a solution of bromine in carbon tetrachloride?
(iii) a drop of water is added to a beaker containing conc. sulphuric acid? [3]

(b) In the preparation of zinc sulphate from zinc carbonate :

- (i) What is the first step?
(ii) Write an equation for the chemical reaction taking place.
(iii) How are the crystals of zinc sulphate obtained? [3]

(c) Fill in the blank spaces :

- (i) Ethyl hydrogen sulphate is boiled with water, when _____ takes place, with the formation of _____.
(ii) (1) Write an equation for the reaction in C (i).
(2) Name the functional group of the organic compound is formed in (c) (i). [4]

Question 4.

(a) (i) What do you understand by the following terms :

- (1) Polar covalent compound (2) Non-polar covalent compound.
(ii) State one example each of the above compounds. [3]

(b) (i) Hydrogen chloride gas is polar covalent compound. By drawing a structural diagram show how hydronium ions are formed when it dissolves in water.

- (ii) How do the boiling point and melting point of polar covalent compound compare with ionic compounds? [3]

(c) Fill in the blank spaces :

When the sodium atom reacts with chlorine atom to form sodium chloride, the sodium atom _____ an electron to acquire the electronic configuration of nearest noble gas _____.
The chlorine atom _____ an electron to acquire the electronic configuration of nearest noble gas _____. [4]

Question 5.

- (a) (i) Name one ore of a metal which is concentrated by
(1) Gravity process (2) Froth floatation process.
(ii) Why the bauxite which is an ore of aluminium is not concentrated by the above mentioned process?
(iii) Describe briefly how is the ore of aluminium concentrated? [4]
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- (b) (i) Why is hydrogen chloride gas not collected over water?
(ii) Why hydrogen chloride gas cannot be dried by drying agents, such as calcium oxide and phosphorus pentoxide. Support your answer by chemical equations. [3]
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- (c) Ammonia gas is industrially prepared by compressing the gases to 500 atm pressure and then passing over a catalyst.
(i) Name the catalyst used.
(ii) State the temperature to which catalyst is externally heated before the passage of gases.
(iii) Why the external heating of catalyst is stopped, once the chemical reaction starts between nitrogen and hydrogen. [3]
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Question 6.

- (a) Write chemical equations for the decomposition of nitrates given below :
(i) A non-metallic nitrate which decomposes leaving behind no residue.
(ii) A metallic nitrate which decomposes to form metallic nitrite and oxygen gas.
(iii) A metallic nitrate which decomposes to form a metallic oxide, nitrogen dioxide gas and oxygen.
(iv) A metallic nitrate which decomposes to form a metal, nitrogen dioxide gas and oxygen. [4]
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- (b) How conc sulphuric acid acts as dehydrating agent? Support your answer by three chemical reactions. [3]
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- (c) (i) What is oil of vitriol?
(ii) How it can be prepared in laboratory starting from hydrated sulphate of iron (II). Support your answer by a chemical equation. [3]
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Question 7.

- (a) Calculate correct to 1 decimal place the percentage of nitrogen in ammonium chloroplatinate $[(\text{NH}_4)_2 \text{PtCl}_6]$. [Pt = 195, N = 14, H = 1, Cl = 35.5] [3]
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- (b) A flask contains 6.6 g of carbon dioxide. Calculate :
(i) The number of moles of carbon dioxide present in the flask.
(ii) The number of molecules of carbon dioxide present in the flask.
(iii) The volume occupied by carbon dioxide present in the flask.
(iv) The mass of one molecule of carbon dioxide in grams.
[C = 12; O = 16 and Avogadro's number = 6×10^{23}] [4]
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- (c) Calculate the empirical formula of a compound having the following percentage composition.
[Na = 42.1%, P = 18.9% and oxygen = 39%] [Na = 23, P = 31 and O = 16]. [3]
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