

Sample paper - 2

GENERAL INSTRUCTION

1. You will not be allowed to write during the 15 minutes. This time is being spent in reading the question paper.
2. The time given at the head of this paper is the time allowed for writing the answer.
3. Attempt all questions from **Section A** and any 4 questions from **Section B**.
4. The intended marks for questions or parts of questions are given in brackets []

Time: 2Hrs

Max.

Marks:80

SECTION A [40 marks]

1.

(a) Fill in the blanks from the choices given in brackets.

- (i) Which natural oxide causes greenhouse effect..... ? (water, methanol)

Sol:

water

- (ii) A black metallic oxide which dissolves in nitric acid greenish blue solution is (copper oxide, zinc oxide)

Sol:

Copper oxide

- (iii) A organic gas which forms and precipitate with Fehling's solution is (Acetylene, ethane)

Sol:

Acetylene

- (iv) is an example of non-polar covalent compound. (H_2O , N_2)

Sol:

N_2

- (v) A solution used for storing biological specimens is (CCl_4 , formalin)

Sol:

Formalin

(b) Choose the correct answer from the options.

- (i) The electron affinity of the electron in group 1 to 7 on moving from left to right across a periodic table,

(a) Increases

- (b) Decreases
- (c) Decreases and then increases
- (d) Increases and then decreases

Sol: a

increases

- (ii) The IUPAC name of acetylene

- (a) Ethane
- (b) Propyne
- (c) ethyne
- (d) None of these

Sol:

Ethyne

- (iii) Oleum is also known as,

- (a) Gypsum
- (b) White vitrol
- (c) Green vitrol
- (d) Pyrosulphuric acid

Sol:

Pyrosulphuric acid

- (iv) Which molecule contains a triple covalent bond is

- (a) Methane
- (b) Water
- (c) Ammonia
- (d) Nitrogen

Sol:

Nitrogen

- (v) The volume occupied by 7g of nitrogen at STP is

- (a) 4.6L
- (b) 4.8L
- (c) 5.8L
- (d) 5.6L

Sol:

5.6L

- (c) Identify the substance underlined in each of the following cases.

- (i) Substance which conduct electric current in molten or aqueous state.

Sol:

Electrolyte

- (ii) Which type of electrolyte allows a large amount of electricity to flow through the?

Sol:

Strong electrolyte

- (iii) The electrode connected to the positive terminal of the battery.

Sol:

Anode

- (iv) An example of saturated hydrocarbons

Sol:

Butane

- (v) The acid which is a weak mineral acid.

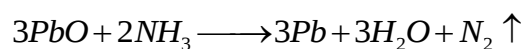
Sol:

Carbonic acid

- (d) Give the balanced equation of the following,

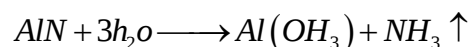
- (i) When lead oxide is treated with ammonia

Sol:



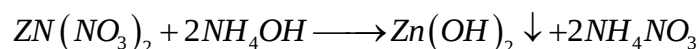
- (ii) When nitride of trivalent metal reacts with water.

Sol:



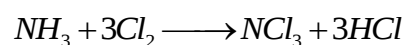
- (iii) When ammonium hydroxide solution is added to the zinc nitrate

Sol:



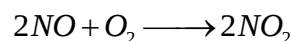
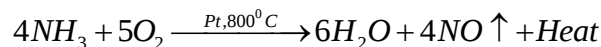
- (iv) When ammonia reacts with excess of chlorine.

Sol:



- (v) When ammonia reacts with oxygen.

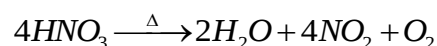
Sol:



- (e) Give one relevant observation for each of the following reaction.

- (i) On heating of conc. Nitric acid.

Sol:



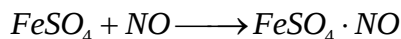
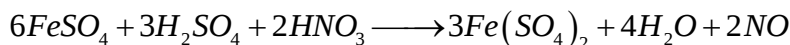
- (ii) On heating of metallic nitrate.

Sol:



- (iii) **Addition of conc. Sulphuric acid and nitric acid to freshly prepared saturated solution of Iron [II] sulphate.**

Sol:



- (iv) **Burning of ammonia in oxygen.**

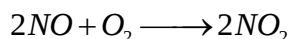
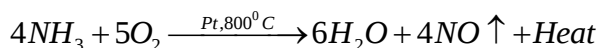
Sol:

Ammonia burns with oxygen with yellowish flame.

- (v) **Catalytic oxidation of ammonia.**

Sol:

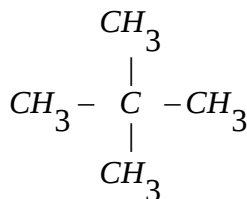
Reddish brown vapour of nitrogen oxide is produced.



- (f) **Draw the structural formula for the following .**

- (i) **2,2dimethyl propane**

Sol:



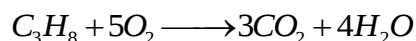
- (ii) **Pentylene**

Sol:



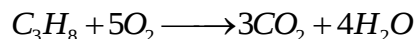
- (g)

- (1) **Determine the volume of propane is burnt for 50cm³ of oxygen in the reaction?**



Sol:

The reaction is



It is clear that for every 5 volumes of oxygen, 1 volume of propane is burnt

Therefore, volume of propane burnt for every 50cm³ of oxygen

$$= \frac{1}{5} \times 50 = 10\text{cm}^3$$

- (2) **Calculate the mass of 2 atoms of oxygen**

Sol:

Number of oxygen atoms in 16.0 g of atomic oxygen

$$6.022 \times 10^{-23} \text{ atoms}$$

Therefore,

Mass of 2 atoms of oxygen

$$\begin{aligned} & \frac{16.0}{6.022 \times 10^{-23}} \times 2 \\ &= 5.31 \times 10^{-23} \text{ g} \end{aligned}$$

(3) Determine the empirical formula of the compounds with the following composition

$$\text{Zn} = 47.8, \text{Cl} = 52.2$$

Sol:

Element	Percentage composition	Atomic mass	Atomic ratio	Simplest ratio
Zn	47.8	65	$\frac{47.8}{65} = 0.73$	$\frac{0.73}{0.73} = 1$
Cl	52.2	35.5	$\frac{52.2}{35.5} = 1.46$	$\frac{1.46}{0.73} = 2$

(h) Match the atomic number 11, 17, 9, 18, 7 with each of the following.

(I) Element which have the highest electron affinity in the third period.

Sol:

17 (Chlorine)

(II) Element which has the least ionization potential in third period.

Sol:

11 (Sodium)

(III) Most active non-metal.

Sol:

9 (Fluorine)

(IV) An element in period 3rd whose electron affinity is zero.

Sol:

18 (Argon)

(V) The numbers of electrons present in the valance shell of Halogen.

Sol:

7 (Valence electrons present in halogen)

SECTION B [40 Mark]

2.

(a) Arrange the following as per the instruction given bellow.

(I) F, Cl, Br, I, At (decreasing order of electronegativity)

Sol:



(II) F, Cl Br, I, at (increasing order of ionization potential)

Sol:



(III) F, Cl, Br, I At (increasing order of atomic size).

Sol:



(IV) F, Cl, Br, I, At (increasing order of non-metallic character).

Sol:



(b) Answer the following questions.

(1) Distinguish between zinc nitrate solution and calcium nitrate solution using sodium hydroxide solution.

Sol:

Sodium hydroxide solution, when added to zinc nitrate solution, a white precipitate is formed which is soluble in excess of sodium hydroxide. On adding sodium hydroxide solution to calcium nitrate, a white precipitate is formed.

(2) Distinguish between iron (II) chloride and iron(III) chloride using ammonium hydroxide.

Sol:

Iron(II) chloride, on reaction with ammonium hydroxide, a dirty green precipitate is formed which changes to reddish brown. Ammonium hydroxide, when reacts with iron(III) chloride, a reddish brown precipitate is formed.

3.

(a) With the reference of electrolysis of copper sulphate solution

(I) What happens if the electrolysis of aqueous sulphate between platinum electrodes occurs?

Sol:

During the electrolysis of Copper sulphate , Cu^{2+} ions are discharged at the cathode and deposited as pinkish copper metal, but OH^- ions are discharged at anode.

The electrolyte consist of hydrogen and sulphate ions which associate to form colorless sulphuric acid.

- (II) Compare the change in the mass of cathode with the change in the mass of anode.

Sol:

The mass of cathode increases whereas that of anode decreases due to the deposition of pure copper on cathode.

- (b) Choose the ions in each case, that would get selectively discharged from the aqueous mixture of the ions.

- (I) OH^- , Cl^- , SO_4^{2-}

Sol:



- (II) Ag^+ , Cu^{2+} , Zn^{2+}

Sol:

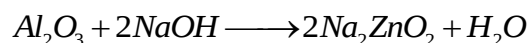


4.

- (a) Give the balanced chemical equation of the following.

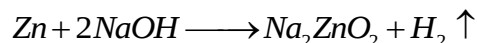
- (I) Caustic soda solution and aluminium oxide.

Sol:



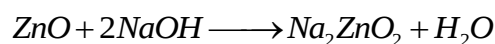
- (II) Zinc is heated with sodium hydroxide solution.

Sol:



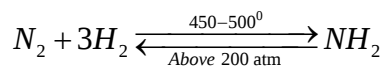
- (III) Zinc oxide is treated with sodium hydroxide solution.

Sol:



- (b) Give the balanced chemical equations to show how N_2 and H_2 converted to ammonia in Haber's process.

Sol:

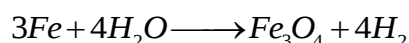


5.

- (I) Determine the mass of iron which will converted into its oxide (Fe_3O_4) by the reaction of 36g of steam on it.

Sol:

The balanced chemical equation is



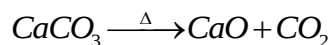
72g of steam will react with 168g of iron

Therefore,

36g of steam will react with $\frac{168}{72} \times 36 = 84g$ of iron.

- (II) **Determine the mass of limestone required to produce 112kg of quick lime by burning**

Sol:



56kg CaO is obtained from limestone = 100kg

Therefore,

112kg of CaO is obtained from lime stone

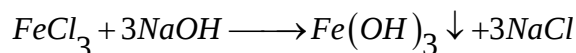
$$\begin{aligned} &= \frac{100 \times 112}{56} \\ &= 200kg \end{aligned}$$

6. **Write the balanced chemical equation of the following.**

- (I) **Action of sodium hydroxide solution on ferric chloride solution.**

Sol:

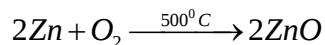
When a sodium hydroxide solution is added to ferric chloride a reddish brown precipitate of ferric hydroxide is formed which is insoluble even in the excess of NaOH.



- (II) **Action of heat on zinc metal in presence of air at 500° C.**

Sol:

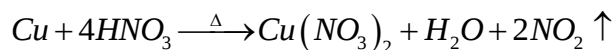
When zinc metal is heated in air at 500°C, the metal burns with bluish white flame and forms zinc oxide.



- (III) **Action of heat on copper turnings in presence of HNO₃.**

Sol:

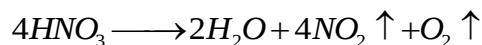
When zinc metal turnings are heated with conc. HNO₃ copper nitrate, water are formed with the evolution of NO₂ gas.



(IV) Action of heat on copper turnings in presence of conc. HNO₃.

Sol:

When conc. HNO₃ is heated, it rapidly decomposes to reddish brown nitrogen dioxide gas along with the formation of H₂O and O₂ gas.



7.

(a) Answer the following questions.

- (I) Explain Copper through a good conductor of electricity is non-electrolyte.**

Sol:

Copper is a good conductor of electricity but is a non-electrolyte because copper metal is solid element and does not have mobile ions to conduct electricity. It does not undergo chemical decomposition due to flow of electric current through it.

- (II) Name the gas released at the cathode when acidulated water is electrolyte.**

Sol:

When acidulated water is electrolyzed hydrogen (H₂) gas is evolved.

(b) Complete the following by choosing the correct option from the choice.

- (I) Ferrous salts are..... (brown, light green)**

Sol:

Light green

- (II) The mass of substance containing particles equal to Avogadro's number is called..... (mole, molecules)**

Sol:

Mole

- (III) Zinc chloride solution reacts with NH₄OH precipitate solution to give a..... (white, blue)**

Sol:

White