

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. Section A is compulsory and carries 40 marks. Attempt any four questions from section B

Section A (40 Marks)

Question 1

Choose the correct answers to the questions from the given options

[15x1]

- i. The technique of depositing a layer of superior metal over a basic metal using electric current is called
 - a. Electrolysis
 - b. Electrolytic reduction
 - c. Electrolytic oxidation
 - d. Electroplating
- ii. Factors affecting the periodic property of elements are
 - a. number of shells
 - b. nuclear charge
 - c. both a and b
 - d. none of the above
- iii. Among the elements given below the elements with least electronegativity is
 - a. Lithium
 - b. Carbon
 - c. Boron
 - d. Fluorine
- iv. Which of the following is a polar covalent compound?
 - a. H_2O
 - b. CCl_4
 - c. O_2
 - d. CH_4
- v. If pH of the solution is three, then the solution is
 - a. Strong acid
 - b. Strong base
 - c. Weak acid
 - d. Weak base
- vi. Sodium hydroxide on reaction with ammonium chloride gives sodium chloride, water, and the gas liberated is
 - a. Nitrogen
 - b. Hydrogen
 - c. Ammonia
 - d. Carbon dioxide
- vii. Oxides of which of the following is amphoteric in nature?
 - a. Zinc
 - b. Lead
 - c. Aluminium
 - d. All of the above
- viii. Which of the following statements is/are correct?

P. Alkalies are bases which are soluble in water.

Q. Acid-base indicators give different colours in acid and alkaline solutions.

R. A monobasic acid can form an acid salt.

 - a. P only
 - b. P and Q
 - c. P and R
 - d. Q and R

- ix. The metallic hydroxide, which forms a deep inky blue solution with excess of ammonium hydroxide solution is
- Ferrous hydroxide
 - Copper hydroxide
 - Calcium hydroxide
 - Ferric hydroxide
- x. The vapour density of CH_3OH is (at mass of C =12, H =1, O =16)
- 32
 - 64
 - 16
 - 126
- xi. Electrode connected to the positive terminal of the battery
- Cathode
 - Anode
 - Electrolyte
 - Inner electrode
- xii. Choose the electrolyte
- Alcohol
 - Kerosene oil
 - Cane sugar
 - Dilute HCl
- xiii. P, Q and R are elements belonging to the same period with atomic radii 118pm, 99pm and 160pm. Identify the **correct** statement.
- The electron affinity of R is the highest
 - The ionisation potential of P is the lowest
 - The most electronegative element is Q
 - The element R has maximum number of shells
- xiv. Product obtained at cathode and anode, respectively during the electrolysis of acidified water
- Hydrogen, gas, oxygen gas
 - Oxygen gas, hydrogen gas
 - Hydrogen gas, chlorine gas
 - Chlorine gas, hydrogen gas

Directions: In the following question a statement of assertion (A) followed by a statement of Reason (R) is given. Choose correct answer out of the following choices.

- Assertion (A) and reason (R) both are correct statements and reason (R) is correct explanation for assertion (A).
 - Assertion (A) and reason (R) both are correct statements but reason (R) is not correct explanation for assertion (A).
 - Assertion (A) is correct statement but reason (R) is wrong statement.
 - Assertion (A) is wrong statement but reason (R) is correct
- xv. **Assertion:** Fluorine, chlorine, and bromine are halogens.
Reason : Halogen have five valence electrons.

Question 2

- A. Answer the following questions based on the table given below.

[5]

Element	Electronic Configuration
A	2,5
B	2
C	2,6
D	2,8,6
E	2,8,3
F	2,8,8

- Which two elements belong to the same group?
- Which elements are noble gases?
- Which element is most electronegative amongst them?
- Which two elements can form an ionic bond when they interact?
- Which element should have highest ionization energy amongst them?

B. Identify the following

[5]

- A bond formed between two atoms by sharing of a pair of electrons, with both electrons being provided by the same atom.
- A salt formed by the complete neutralisation of an acid with a base
- The energy required to remove an electron from a neutral gaseous atom.
- Process of formation of ions from molecules which are not in ionic state
- The formula of a compound, which shows the simplest whole number ratio between the atoms of the elements in the compound.

C. Complete the sentences by choosing the correct answer from the brackets :

[5]

- The ion which would be discharged most readily during electrolysis is _____ (Zn^{2+} / Cu^{2+}).
- The ratio between the number of molecules in 2g of hydrogen and 32g of oxygen is _____ (1:1 / 2:1).
- _____ (AgCl / FeCl_3) can be prepared by direct combination of its elements.
- When NaOH is added to solution A, a reddish brown precipitate is obtained. The cation present in solution A is _____ (Fe^{3+} / Fe^{2+}).
- Electron affinity is the amount of energy _____ (released / absorbed) when one or more electrons is added to the valence shell.

D. Match the following

[5]

A	B
i. Tribasic acid	i. Triple covalent bond
ii. Hydrogen chloride	ii. Highly electropositive
iii. Nitrogen	iii. Highly electronegative
iv. Francium	iv. Polar
v. Fluorine	v. Phosphoric acid

E. (a) Draw the electron dot diagrams of:

[3]

- Hydronium ion
- Calcium oxide
- Methane

(b) Calculate:

[2]

- A gas cylinder filled with hydrogen holds 15 g of the gas. The same cylinder holds 175 g of gas 'X' under same temperature and pressure. Calculate the vapour density of gas 'X'.
- Give the empirical formula of CH_3COOH .

Section B (40 Marks)

Question 3

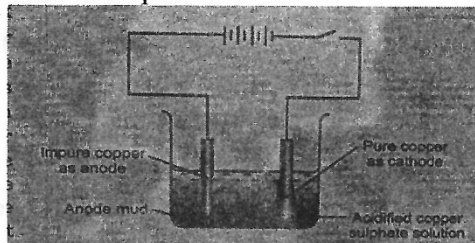
- Define redox reaction. Give one example of redox reaction. [2]
- Give two important differences between a strong electrolyte and a weak electrolyte [2]
- The electron affinity of an element X is greater than that of element Y [3]
 - How is the oxidising power of X likely to compare with that of Y?
 - Which is more electronegative X or Y?
 - State whether X is likely to be placed to the left or right of Y in the periodic table
- What do you mean by electronegativity? Name two factors that affect electronegativity of an element. [3]

Question 4

- Copper sulphate solution is electrolysed using copper electrodes [2]
 - Which electrode is the oxidising electrode?
 - Write an equation for the reaction occurring at the above electrode
- Name a substance that can turn [2]
 - Methyl orange to yellow colour
 - Methyl orange to red colour
- How much ammonia is produced when 11.2 g of nitrogen reacts with hydrogen? What is the amount of hydrogen required for the reaction ($\text{N}=14$, $\text{H}=1$)? [3]

D. The diagram given below is a representation of a process [3]

i. Name the process



ii. Write chemical equations that are taking place at the anode and cathode

Question 5

A. Give reasons for each of the following [2]

- Covalent compounds do not conduct electricity
- Acetic acid does not form an acid salt, but sulphuric acid does form

B. Calculate the number of moles of the following [2]

- 2.3 g of sodium
- 100 g of magnesium
(Given gram atomic weight of sodium = 23, magnesium = 24)

C. Explain the terms : [3]

- Gram molecular mass
- Electron affinity
- Electrolysis

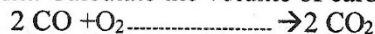
D. Answer the following questions in one or two sentences [3]

- State Gaylussac's law
- What do you mean by the term diacidic base ?
- How does ionization potential vary when we move from left to right in a period?

Question 6

A. State the reason why calcium nitrate and lead nitrate can be distinguished by adding ammonium hydroxide solution to the salt solution. Write your observation also in both the cases. [2]

B. In a blast furnace, 400 ml of carbon monoxide is mixed with 400 mL of oxygen at room temperature and burnt. Calculate the volume of carbon dioxide formed. [2]



C. Identify whether the following reactions are oxidation or reduction [3]

- $\text{Fe}^{+2} \longrightarrow \text{Fe}^{+3}$
- $\text{Cu}^{+2} \longrightarrow \text{Cu}^{+1}$
- $\text{Na} \longrightarrow \text{Na}^{+1}$

D. Zenesis is a chemical lab located in France. Mr. Jakes works in Zenesis as a lab assistant. He received a compound-X from Ranjana Jaiswal to analyse the sample and answer the following questions based on some data given below. What will be your answer for the given questions, if you are Mr. Jakes [3]

- Compound-'X' consists of molecules. What type of bonding is present in X?
- If the compound-X is in molten state then it will be (good/ bad) conductor of electricity.
- Which type of forces will be existing in compound X?

Question 7

A. Differentiate between the following pairs based on the criteria given. [3]

- PbCl_2 and ZnCl_2 (using excess of ammonium hydroxide)
- Anode and cathode (the nature of ion discharged here)
- Cu wire and CuSO_4 solution (current carrying particles in it)

B. Give balanced equation in each case: [3]

- Action of NH_4OH on FeCl_3
- Action of NaOH on NH_4Cl
- Action of HCl on CuCO_3

C. Find [2]

- Number of moles of a gas which occupies a volume of 11.2 litres at STP.
- Number of molecules in 73g of HCl [$\text{H}=1$, $\text{Cl}=35.5$]

D. Identify the underlined substance. [2]

- The electrode which increases in mass during the electrorefining of copper.
- The particles present in a non electrolyte.

XXXXXXX