

HISSAN CENTRAL EXAMINATION - 2080 (2023)

Class : XI

Time : 3hrs

F.M: 75

CHEMISTRY (3021 A)

Attempts all questions.

GROUP A

Write the correct option in your answer sheet.

[11 × 1 = 11]

1. A compound was found to contain nitrogen and oxygen in the ratio 28 g and 80 g respectively. Then the formula of compound is
a. NO b. N₂O₃ c. N₂O₅ d. N₂O₄
2. Shape of orbital is given by:
a. Principal quantum number b. Azimuthal quantum number
c. Magnetic quantum number c. Spin quantum number
3. Electrons of an atom can be removed by supplying energy. This energy is ionization potential. Among the following elements which one has the highest second ionization potential?
a. Nitrogen b. Oxygen c. Carbon d. Fluorine
4. On passing 3F of electricity through the three electrolytic cells connected in series containing A⁺, B²⁺ and C³⁺ respectively. The equivalent weight of B is
a. M/3 b. M/2 c. M d. 2M
5. Most favorable condition for the formation of electrovalent compounds are
a. low charge of ions, large cation and small anion
b. low charge of ions, small cation and large cation
c. high charge of ions, small cation and small anion
d. high charge of ions, large cation and large anion
6. Zinc reacts with very dilute HNO₃ to give zinc nitrate and other compound is
a. NO₂ b. NH₄NO₃ c. NO d. O₂
7. Oxalic acid when heated with conc. H₂SO₄ gives out
a. H₂O and CO₂ b. CO and CO₂
c. SO₂ and CO₂ d. CO and SO₂
8. When limestone ore is heated, CO₂ is given off. This operation in metallurgy is known as

- a. Smelting b. Calcination c. Roasting d. Poling
9. Which of the following oxides react with HCl and NaOH?
a. CaO b. ZnO c. N₂O₅ d. CO₂
10. Minamata diseases caused by toxicity of metal.
a. As b. Hg c. Pb d. Cd
11. Batch process is used to manufacture.
a. cosmetics b. petrol c. cement d. diesel

GROUP B

[8 × 5 = 40]

12. To detect the foreign elements like N, S, X present in an organic compound, the organic compound is fused with sodium to make sodium extract by plunging in distilled water.
i. Why is it necessary to make sodium extract to detect the foreign element? [2]
ii. How would you identify the presence of N in the organic compound? [3]
13. i. Define homologous series. [1]
ii. Give any two important characteristics of homologous series. [2]
iii. Draw structure formula of first member of ketone and its IUPAC name. What is its functional isomer? [1+1]
14. i. State Boyle's law. [1]
ii. Derive the relation $P_1V_1 = P_2V_2$ [1]
iii. Draw a plot of volumes of a gas against changing pressure at constant temperature. [1]
iv. A fire extinguisher of capacity 5 litres contains 5 kg of CO₂ gas. What volume of the gas will the extinguisher deliver to extinguish fire at STP? [2]
15. Rutherford performed a α -ray scattering experiment in order to explain the sub-atomic particles in an atom.
i. What observations in the scattering experiment led Rutherford to make the following conclusions.
a. A nucleus is positively charged. [1]
b. The whole mass of an atom is concentrated at the centre of the nucleus. [1]
c. Most of the space in an atom is empty. [1]
ii. How would you point out the limitation of Rutherford atomic model? [2]

OR

GROUP C

[3 × 8=24]

- i. Justify with an example that oxidation and reduction is simultaneous process. [2]
- ii. Balance the following redox-reaction by oxidation number or ion electron method.

$$\text{HNO}_3 + \text{H}_2\text{S} \rightarrow \text{NO}_2 + \text{S} + \text{H}_2\text{O}$$
 [3]
16. You are given to two elements P and Q where outermost electronic configuration is $3s^2$ and $3s^2 3p^5$ respectively.
 - i. What type of compound is formed between P and Q. Write its molecular structure? [2]
 - ii. Draw Lewis structure of the compound. [1]
 - iii. Mention any two important properties of the compound. [2]

OR

 - a. Give reason
 - i. Na^+ and Mg^{++} contain same number of electron but size of Na^+ is greater than Mg^{++} . [2]
 - ii. Alkali metals have low ionization energy. [1]
 - b. Summarize the factors that affect on electron affinity. [2]
17. a. Write chemical reaction for the preparation of Cl_2 in laboratory. [2]
 b. What is the action of chlorine on NaOH ? [2]
 c. How would you test the presence of chloride ion in aqueous solution? [1]
18. i. What is meant by nascent hydrogen? [1]
 ii. Give two chemical reactions to show nascent hydrogen is strong reducing agent than molecular hydrogen. [2]
 iii. Distinguish between ortho and para hydrogen. [2]
19. Carbon monoxide is present in chimney gas when combustion takes place in insufficient supply of air.
 - a. Write the chemical reaction for the preparation of carbon monoxide. [1]
 - b. What happens when carbon monoxide is treated with
 - i. Nickel and [2]
 - ii. NaOH [2]
 - iii. Why is CO gas harmful? [2]
20. The reactant that is entirely used up in a reaction is called limiting reactant. A chemical reaction is carried out by adding 7.3 gm of pure HCl and into 11 gm of pure CaCO_3 .
 - i. Write balanced chemical equation for the above reaction.
 - ii. Identify which one is limiting reagent and why?
 - iii. How many molecules of water are produced in the reaction.
 - iv. Calculate the mass of CaCl_2 formed.
 - v. Find the mole of unreacted reactant left over.
 - vi. What volume of CO_2 are produced since the reaction is carried out at 27°C temperature and 0.5 atmospherics pressure? [1+2+1+1+1+2]
21. a. An organic reaction sequence is given as:

$$\text{CHCl}_3 \xrightarrow{\text{P}} \text{C}_2\text{H}_2 \xrightarrow{\text{Q}} \text{C}_2\text{H}_4 \xrightarrow{\text{R}} \text{HO} - \text{CH}_2 - \text{CH}_2 - \text{OH}$$
 Identify the reagent or catalyst and conditions of P, Q, and R in the above reaction sequence. [3]
 b. Draw the structural formula of 2,2,3-trimethyl pentane indicating tertiary carbon. [2]
 c. How is benzene obtained from
 - i. Sodium benzoate and [2]
 - ii. ethyne [2]
 d. Convert benzene into BHC. [1]
22. a. How are chemical industries responsible for environmental pollution? [3]
 b. Describe Down's process with a labeled diagram for the manufacture of sodium. [5]

OR

Ammonia is manufacture in large scale by Haber process.

- i. Write down the physico-chemical principle for the maximum yield of ammonia. [3]
- ii. Draw a well labeled diagram for the synthesis of ammonia by Haber's process. [2]
- iii. Mention the different parts and their functions of the Haber's plant [3]

THE END