Roll No .....

Y–24–X

Total No. of Questions : **27]**

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XIARJKUT23
9224–X
CHEMISTRY

Time : 3.00 Hours]

[Maximum Marks : 70

(Very Short Answer Type Questions) 1 each

1. Number of molecules in 34 grams of ammonia is :

   (A) 6.023×10^{23} (B) 3.204×10^{23}

   (C) 0.5×10^{23} (D) 1.2×10^{24}

2. What is Limiting reagent ?

3. What is the value of ΔS for an adiabatic process ?

4. Alkali metals import characteristic colour to the flame. (True/False)

5. The method used to separate a volatile solid form a non-volatile solid is called ..... . (Fill in the blank)

(Short Answer Type Questions—I) 2 each

6. Write electronic configuration of Cr and Cu and give the number of unpaired electrons in each.

7. How does the atomic radius vary in a period and in a group ?

8. Write molecular orbital electronic configuration of O_2 molecule and calculate its bond order.

9. What happens to the equilibrium state, if an inert gas is added at constant volume ?

10. Calculate the oxidation number of S in H_2SO_4 and balance the following equation by ion electron method in basic medium :

$$MnO_4^- + I^- \longrightarrow MnO_2 + IO_3^-$$

11. Write *four* advantages of using hydrogen as fuel.

12. Define the following :

    (a) Pollutant

    (b) Smog

    (c) Acid rain

Or

What are the sources of NO_2 emission in atmosphere ?

(Short Answer Type Questions—II) 3 each

13. Percentage composition of an organic compound containing carbon, hydrogen and oxygen is as follows :

C = 40%, H = 6.67% and O = 53.33%

The vapour density of the compound is 30. Find its empirical and molecular formula.

14. What are quantum numbers ? Discuss the significance of magnetic quantum number.

15. What is ionisation enthalpy ? Why does first ionisation enthalpy increase across the period, whereas decrease down the group ?

16. Give the shapes of the following covalent molecules using VSEPR theory :

(i) NH_3

(ii) H_2O

(iii) SF_6

(iv) BF_3

(v) BeF_2

(vi) CH_4

17. Derive ideal gas equation using the expressions of Boyle's law, Charles' law and Avogadro's law.

18. What are ideal and real gases ? What is the cause of deviation of real gases from ideal gas behaviour ?

19. Write Gibbs-Helmholtz equation. Explain the state of chemical reaction when :

(i) $\Delta G = 0$

(ii) $\Delta G > 0$

(iii) $\Delta G < 0$

20. Explain the term common ion effect. How does the common ion effect help in the salting out of soap ?

21. Give IUPAC names of the following organic compounds :

(i) CH_3CN

(ii) HCHO

(iii) $CH_3-\underset{\underset{OH}{|}}{CH}-COOH$

2. How can you prepare ethene from ethanol ? Give reactions when ethene is treated with Bayer's reagent and hydrogen in presence of Ni as catalyst.

23. Write notes on the following :

(i) Friedel-Crafts alkylation

(ii) Wurtz reaction

(iii) Nitration of benzene

1. State Markovnikov's rule and explain it by the addition of HBr to propene.

(Long Answer Type Questions) 5 each

25. Mention the general trends in group I with increasing atomic number (down the group) with respect to :

(i) Atomic radius

(ii) Ionisation enthalpy

(iii) Flame colouration

(iv) Basic nature of their oxides and hydroxides

Or

Describe Down's process for the preparation of sodium.

26. Give any *one* method for the extraction of boron. Write chemical equations for the reaction of boron with nitrogen, oxygen and chromium.

Or

Mention the hybrid state of carbon in diamond and graphite. Explain the difference in properties of diamond and graphite on the basis of their structures.

7 Write notes on the following :

(i) Electromeric effect

(ii) Inductive effect

(iii) Hyperconjugation

Or

Explain the following reactions with *one* example in each case :

(i) Elimination reaction

(ii) Electrophilic substitution reaction

(iii) Nucleophilic substitution reaction