

Y-24-Z

Roll No.

Total No. of Questions : 27]

[Total No. of Printed Pages : 7

XIARJKUT23
9224-Z
CHEMISTRY

Time : 3.00 Hours]

[Maximum Marks : 70

(Very Short Answer Type Questions)

1 each

1. Which of the following has the maximum number of molecules ?

(A) 44 g of CO_2

(B) 64 g of O_2

(C) 10 g of H_2

(D) 54 g of H_2O

2. Define empirical and molecular formula.

3. What is an open system ?

4. Cesium is the most reactive alkali metal.

(True/False)

5. The charge of carbonium ion is

(Fill in the blank)

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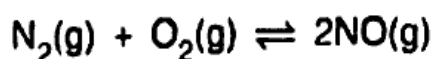
Turn Over

(Short Answer Type Questions—I)

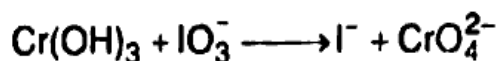
2 each

6. Why atoms with half-filled orbitals have extra stability ?
7. Why do elements in a group show similar chemical properties ?
8. Write molecular orbital electronic configuration of Fluorine molecule (F_2).
Calculate its bond order.

9. How are K_p and K_c related to each other in the following reaction ?



10. Calculate the oxidation number of Mn in $KMnO_4$ and balance the following reaction by ion electron method in basic medium :



11. Write *four* advantages of using hydrogen as fuel.
12. Define the following :

(a) Pollutant

(b) Smog

(c) Acid rain

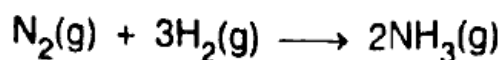
Or

What are the sources of NO_2 emission in atmosphere ?

(Short Answer Type Questions—II)

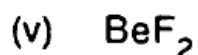
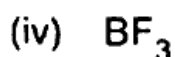
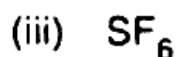
3 each

13. Dinitrogen and dihydrogen react with each other to produce ammonia according to the following chemical equation :



Which one is the limiting reagent ? Calculate the mass of ammonia produced if 2.0×10^3 g of N_2 reacts with 1.0×10^3 g of H_2 .

14. Explain with reasons why 3p-electrons in nitrogen are unpaired and have parallel spin.
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



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 :

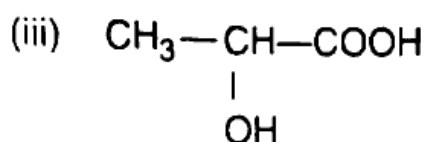
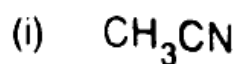
(i) $\Delta G = 0$

(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 :



22. 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

24. 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.

27. 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