11

Register No.

Quarterly Examination - 2023
CHEMISTRY

Time : 3.00 Hrs. Marks

PART - I

I. **Answer all the questions.** 15 x 1 =

1. Which of the following compound(s) has / have percentage of carbon same as that in ethylene (C_2H_4) a) prop
   b) ethyne c) benzene d) ethane
2. 7.5 g of a gas occupies a volume of 5.6 L at 0°C and 1 atm pressure. The gas is
   a) NO b) N_2O c) CO d) CO_2
3. How many electrons in an atom with atomic number 105 can have (n + l) = 8?
   a) 30 b) 17 c) 15 d) unpredictable
4. Which of the following orders of ionic radii is correct?
   a) $H^- > H^+ > H$ b) $Na^+ > F^- > O^{2-}$ c) $F > O^{2-} > Na^+$ d) none
5. Which of the following metal will have highest electron affinity
   a) Na b) Cs c) Ar d) Au
6. The hybridisation of oxygen atom is H_2O and H_2O_2 are respectively.
   a) sp & sp^3 b) sp & sp c) sp & sp^2 d) sp^3 & sp^3
7. Ionic hydrides are formed by.....group.
   a) VII A b) VI A c) VIII A d) IA
8. Use of hot air balloon in sports and meteorological observation in an application
   a) Boyle's law b) Newton law c) Kelvin's law d) Brown's law
9. The intensive property among the quantitive below is
   a) mass b) volume c) enthalpy d) density
10. Kc/Kp for the reaction
    $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2\,NH_{3(g)}$ is a) 1/RT b) $\sqrt{RT}$ c) RT d) $(RT)^2$
11. Solibility of carbondioxide gas in cold water can be increased by
    a) decrease in pressure b) increase in pressure c) increase in volume d) none of these
12. Which one of the following names does not fit a real name
    a) 3 - methyl - 3- hexanol b) 4-methyl-3-hexanone c) 3-methyl-3-hexanone d) 2-methyl cyclo hexanone
13. The isomers of alcohol is.....
    a) aldehyde b) ether c) ketone d) carbinol
14. Which of the group has highest +I effect
    a) CH_3^- b) $CH_3–CH_2^-$ c) $(CH_3)_2\,CH^-$ d) $(CH_3)_3C^-$
15. Ass : 3^0 carbo cations are generally formed more easily than 1^0 carbo cations ions.
    Reas : Hyper conjugation as well as inductive effect due to additional alkyl group stabilize 30^0 carbonium i
    a) Both Ass & Reas are true and reas is the correct explanation of Ass.
    b) Both Ass & Reas are true but reason is not the correct explanation of assertion.
    c) Ass is true but reas is false d) Both Ass and Reas are false

PART - II

Answer **any six questions. Q.No.24 is compulsory.** 6 x 2

16. Define electromeric effect?
17. Write a note on homologous series?
18. State Le-Chatelier principle?
19. Define molar volume?

20. Write a note on Hund's rule.
21. What is effective nuclear charge?
22. Give the uses of heavy water?
23. Name the methods are used for liquefaction of gases?
24. Identify the state and path functions out of the following.
    a) entropy b) heat c) work d) free energy

PART - III

Answer any six questions. Q.No.33 is compulsory. **6 x 3 = 18**

25. (i) Define equivalent mass of an acid.
    (ii) The empirical formula of the compound is $C_2H_3O_3$ and its molar masses-150, then find its molecular formula of the same compound.
26. Derive De-broglie equation for the duality of an electron?
27. Explain the Pauling method for the determination of ionic radius.
28. How do you convert para hydrogen into ortho hydrogen.
29. Derive ideal gas equation?
30. List the characteristic of Gibb's free energy.
31. i) Define Reaction quotient. ii) Give the relation b/w Kp & Kc for the reaction
    $H_2O_{(g)}$ $CO_{(g)}$ $\rightleftharpoons$ $CO_{2(g)} + H_{2(g)}$
32. Describe the classification of organic compounds based on their structure?
33. Give examples for the following types of organic reactions.

    i) β - elimination ii) electrophilic substitution.

PART - IV

Answer all the questions. **5 x 5 = 25**

34. a) (i) Distinguish between oxidation and reduction.
    (ii) Calculate the molar mass of the following compounds urea ; acetone ; sulphuric acid. **(OR)**
    b) (i) For each of the following, give the sub level designation, the allowabloe 'm' values and the number of orbitals
    (i) n = 4, $\ell = 2$ (ii) n = 5, $\ell = 3$
    ii) Give the electronic configuration of Mn^{2+} and Cr^{3+}
35. a) (i) Explain the diagonal relationship ii) What is screening effect. **(OR)**
    b) (i) Describe the three types of covalent hydrides.
    ii) Compare the structure of H_2O & H_2O_2.
36. a) Drive the value of critical constants in terms of Van der waals constant. **(OR)**
    b) State various statements of second law of thermodynamics.
37. a) Derive the relation betwen Kp and Kc and given the relation of Kp & Kc for the value of $\Delta ng = 0$;
    Δng = +ve Δng = –ve. **(OR)**
    b) Give the structure of the following compounds.
    i) 3-ethyl-2methyl-1-pentene ii) 3-chloro butanol iii) 2, 2-dimethyl - 1 - chloropropane
    iv) 3-methyl butan -2-ol v) Acetaldehyde
38. a) (i) Difference between electrophile and nucleophile.
    (ii) Complete the following equation
    i) $CH_3 - Br + KOH \rightarrow$ ii) $CH_3 - O - CH_3 + HI \rightarrow$ **(OR)**
    b) (i) State law of mass action.
    (ii) What are isotopes? Write the names of isotopes of hydrogen.