FIRST MID TERM TEST - 2024

Standard XI   Reg.No. ☐☐☐☐☐☐

CHEMISTRY

Time : 1.30 hrs   Part - I   Marks : 50

I. Choose the correct answer: 10 x 1 = 10

1. Assertion : Two mole of glucose contains 12.044×10^{23} molecules of glucose.

   Reason : Total number of entities present in one mole of any substance is equal to 6.02×10^{22}

   a) both assertion and reason are true and the reason is the correct explanation of assertion

   b) both assertion and reason are true but reason is not the correct explanation of assertion

   c) assertion is true but reason is false

   d) both assertion and reason are false

2. The equivalent mass of ferrous oxalate is

   a) $\dfrac{\text{Molar mass of ferrous oxalate}}{1}$ b) $\dfrac{\text{Molar mass of ferrous oxalate}}{2}$

   c) $\dfrac{\text{Molar mass of ferrous oxalate}}{3}$ d) none of these

3. Which of the following contain same number of carbon atoms as in 6 g of carbon-12

   a) 7.5 g ethane   b) 8 g methane   c) both (a) and (b)   d) None of these

4. Splitting of spectral lines in an electric field is called

   a) Zeeman effect   b) Shielding effect

   c) Compton effect   d) Stark effect

5. How many electrons in an atom with atomic number 105 can have $(n + \ell) = 8$?

   a) 30   b) 17   c) 15   d) unpredictable

6. The temperature at which real gases obey the ideal gas laws over a wide range of pressure is called

   a) Critical temperature   b) Boyle temperature

   c) Inversion temperature   d) Reduced temperature

7. Use of hot air balloon in sports and metrological observation is an application of

   a) Boyle's law   b) Newton's law   c) Kelvin's Law   d) Brown's law

8. Compressibility factor for CO_2 at 400 K and 71.0 bar is 0.8697. The molar volume of CO_2 under these conditions is

   a) 22.04 dm^3 b) 2.24 dm^3 c) 0.41 dm^3 d) 19.5 dm^3

9. Select the molecule which has only one π bond.

   a) $CH_3 - CH = CH - CH_3$ b) $CH_3 - CH = CH - CHO$

   c) $CH_3 - CH = CH - COOH$ d) All of these

10. Which one of the following shows functional isomerism?

    a) ethylene   b) propane   c) ethanol   d) CH_2Cl_2

Part - II

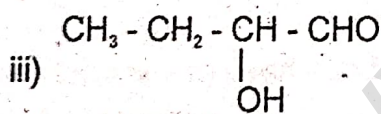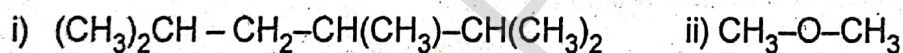**II. Answer any 5 questions. (Q.No.18 is compulsory)**   5 x 2 = 10

11. Define relative atomic mass.
12. How many orbitals are possible for n =4?
13. State Pauli exclusion principle.
14. State Boyle's law.
15. Distinguish between diffusion and effusion.
16. Give the general characteristics of organic compounds.
17. Identify the functional group in the following compounds.
    a) acetaldehyde   b) oxalic acid   c) dimethyl ether   d) methylamine
18. Calculate the molar mass of the following compounds
    (i) Urea $[CO(NH_2)_2]$ (ii) Acetone $[CH_3COCH_3]$

Part - III

III. Answer any 5 questions. (Q.No.26 is compulsory)   5 x 3 = 15

19. Define equivalent mass.
20. Distinguish between oxidation and reduction.
21. State Heisenberg's uncertainity principle.
22. Define orbital? What are the n and ℓ values for $3p_x$ and $4d_{x^2-y^2}$ electron?
23. Derive Ideal gas equation of state.
24. Write the Vander Waals equation for a real gas. Explain the correction term for pressure.
25. Explain Position Isomerism with an example.
26. Give the IUPAC names of the following compounds.

    i) $(CH_3)_2CH - CH_2 - CH(CH_3) - CH(CH_3)_2$ ii) $CH_3 - O - CH_3$

    iii) $CH_3 - CH_2 - \underset{\underset{\displaystyle OH}{|}}{CH} - CHO$

Part - IV

IV. Answer all the questions.   3 x 5 = 15

27. a) Define oxidation number. Write any three rules to find the oxidation number of an element.

    (OR)

    b) Explain (i) Principal Quantum number   (ii) Spin Quantum number

28. a) Derive the values of critical constants in terms of Van der Waal's constants.

    (OR)

    b) i) Define Joule-Thomson effect.
    ii) In what way real gases differ from ideal gases.

29. a) Describe the classification of organic compounds based on their structure.

    (OR)

    b) Explain Paper Chromatography.

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