11 Std.   **Chemistry**   Reg No. ☐☐☐☐☐☐

I MID TERM TEST 2023

Time : 1.30 Hrs   **Total Marks : 35**

Part A

Answer all the questions: 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 6.022×10^{22}.
   (a) both assertion and reason are true and the reason is the correct explanation of assertion.
   (b) both assertion and reason are true and the reason is not the correct explanation of assertion. (c) assertion is true but reason is false. (d) both assertion and reason are false.

2. Which of the following is / are true with respect to carbon – 12.
   (a) relative atomic mass is 12 u   (b) oxidation number of carbon is +4 in all its compounds
   (c) 1 mole of carbon – 12 contain 6.022×10^{22} carbon atoms. (d) all of these

3. The maximum number of electrons in a sub shell is given by the expression
   (a) $2n^2$ (b) $2l + 1$ (c) $4l + 2$ d) none of these

4. The total number of orbitals associated with the principal quantum number n = 3 is
   (a) 9   (b) 8   (c) 5   (d) 7

5. The temperatures 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

6. Maximum deviation from ideal gas is expected from
   (a) CH_4 (g)   (b) NH_3 (g)   (c) H_2 (g)   (d) N_2 (g)

7. All the naturally occurring processes proceed spontaneously in a direction which leads to
   (a) decrease in entropy (b) increase in enthalpy (c) increase in free energy (d) decrease in free energy.

8. Heat of combustion is always
   (a) positive   (b) negative   (c) zero   (d) either positive or negative

9. If temperature and volume of an ideal gas is increased to twice its values, the initial pressure P
   Becomes   (a) 4P   (b) 2P   (c) P   (d) 3P

10. The energy of an electron in the 3rd orbit of hydrogen atom is – E. The energy of an electron in the first orbit will be   (a) – 3E   (b) – E/3   (c) – E/9   (d) – 9E

Part B

Answer any three of the follwing, Q.No. 15 is compulsory.   3 x 2 = 6

11. What are state function? Give two examples.
12. What is the difference between molecular mass and molar mass? Calculate the molecular mass and molar mass for carbon monoxide.
13. State Pauli's exclusion principle.
14. Distinguish between diffusion and effusion.
15. What is the empirical formula of the following? (i) Fructose ($C_6H_{12}O_6$) found in honey.
    (ii) Caffeine ($C_8H_{10}N_4O_2$) a substance found in tea and coffee.

Part C

Answer any three of the following: Q.No. 20 is compulsory.   3 x 3 = 9

16. Write short notes on limiting reagent and excess reagent.
17. State zeroth and third law of thermodynamics.
18. Explain the following observations.
    a) The tyre of an automobile is inflated to slightly lesser pressure in summer than in winter. b) The size of a weather balloon becomes larger and larger as it ascends up into larger altitudes.
19. List the characteristics of internal energy.
20. For each of the following, give the sub level designation, the allowable m values and the number of orbitals. i) n = 4, l = 2   ii) n = 5, l = 3   iii) n = 7, l = 0

Part D

                                                                2 x 5 = 10

Answer all the questions.

21. A. i) Write the electronic configuration and orbital diagram for nitrogen. ii) Explain the postulates of Bohr's atomic model. **(OR)**
    B. An organic compound present in vinegar has 40% carbon, 6.6% hydrogen and 53.4% Oxygen. Find the empirical formula. If its molar mass is 60 find its molecular formula.

22. A. Write the Van der Waals equation for a real gas. Explain the correction term for pressure and volume. (OR)
    B. Suggest and explain an indirect method to calculate lattice enthalpy of sodium chloride crystal.

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