

COMMON HALF YEARLY EXAMINATION - 2022

Standard X
CHEMISTRY

Reg. No. [] [] [] [] []

Time: 3.00 hours

Marks: 70

Part - I

I Choose the correct answer

1. Which of the following compounds has / have percentage of carbon same as that in ethylene (C_2H_4) $15 \times 1 = 15$

a) propene b) ethyne c) benzene d) ethene

2. Match the following:

A. $1s^2 2s^2 2p_1 2p_2$

B. $1s < 2s < 2p < 3s < 3p$

C. $n = 1; l = 1; m = 0; s = \pm \frac{1}{2}$

D. $\Delta x \cdot \Delta p \geq \frac{\hbar}{4\pi}$

A B C D

a) 2 3 4 1

b) 2 1 4 3

c) 3 1 2 4

d) 3 2 1 4

a. Heisenberg's Uncertainty Principle

b. Hund's Rule

c. Aufbau principle

d) Pauli Exclusion Principle

3. In a given shell, the order of screening effect is

a) $s > p > d > f$ b) $s > p > f > d$ c) $f > d > p > s$ d) $f > p > s > d$

4. The cause of permanent hardness of water is due to

a) $Ca(HCO_3)_2$ b) $Mg(HCO_3)_2$ c) $CaCl_2$ d) $MgCO_3$

5. Assertion : Alkali metals act as good reducing agents

Reason : Alkali metals have higher ionization energies.

a) assertion is true, but reason is false b) both assertion and reason are true

c) assertion is false but reason is true d) both assertion and reason are false

6. Use of hot air balloon in sports and meteorological observation is an application of

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

7. The correct thermodynamic conditions for the spontaneous reaction at all temperature is

a) $\Delta H < 0$ and $\Delta S > 0$ b) $\Delta H < 0$ and $\Delta S < 0$

c) $\Delta H > 0$ and $\Delta S = 0$ d) $\Delta H > 0$ and $\Delta S > 0$

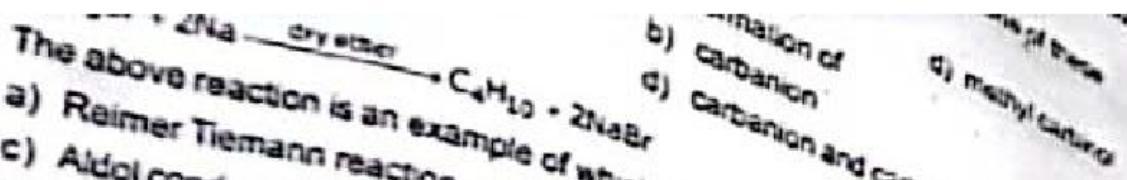
8. Solubility of carbon dioxide gas in cold water can be increased by

a) increase in pressure b) decrease in pressure

c) increase in volume d) none of these

9. Osmotic pressure (π) of a solution is given by the relation

a) $\pi = nRT$ b) $\pi V = nRT$ c) $\pi RT = n$ d) none of these



- b) formation of carbocation
- c) carbocation and carbocation
- d) methyl cation

- a) Reimer Tiemann reaction
- c) Aldol condensation

14. Match the compounds given in column I with suitable items given in column II
- | Column I | Column II |
|-------------------------|----------------------|
| A. Iodoform | 1. Fire extinguisher |
| B. Carbon tetrachloride | 2. Insecticide |
| C. CFC | 3. Antiseptic |
| D. DDT | 4. Refrigerants |

- a) A-2, B-4, C-1, D-3
- c) A-1, B-2, C-3, D-4

15. The pH of normal rain water is
- a) 6.5
 - b) 7.5
 - c) 5.6
 - d) 4.5

Part - II

16. Calculate the molar mass of the following compounds



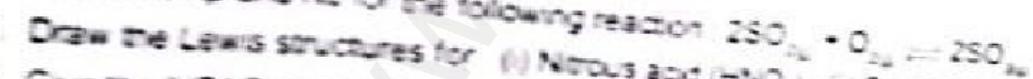
$6+2+12$

17. State Pauli's exclusion principle

18. Give the uses of heavy water

19. Distinguish between diffusion and effusion.

20. Write the K_c and $K_{c'}$ for the following reaction



21. Draw the Lewis structures for (i) Nitrous acid (HNO_2) (ii) Sulfur trioxide (SO_3)

22. Give the IUPAC name of the following compounds

- (i) CH_3OCH_3
- (ii) $\text{CH}_3 = \text{CH} - \text{CH} = \text{CH}_3$

23. What are nucleophiles? Give suitable example

24. $\text{BOH} + \text{CH} \xrightarrow[673 \text{ K}]{\text{Reactions for 10e}}$?

(3)

Part - III

A Chemistry

33. Answer any 6 questions. (Q.No.28 is compulsory) 6 x 5 = 30
25. How many radical nodes for 2s, 3d and 4f orbitals exhibit? How many angular nodes?
26. State the trends in the variation of electronegativity in group and periods.
27. Discuss the similarities between beryllium and Aluminium.
28. Calculate the entropy change when 1 mole of ethanol is evaporated at 201 K. The molar heat of vapourisation of ethanol is 39840 J mol⁻¹.
29. State Le-Chatelier principle.
30. What is Reverse Osmosis?
31. Explain Markownikoff's rule with suitable example.
32. Write short notes on the following i) Roasting process ii) Down process.
33. What is Green chemistry?

Part - IV

5 x 5 = 25

IV. Answer all the Questions.

34. a) State the Postulations of the Bohr's model of an atom. (OR) [3]
- b) i) How do you convert para hydrogen into ortho hydrogen?
ii) Explain diagonal relationship. [2]
35. a) Explain the Pauling method for the determination of ionic radius. (OR) [2]
- b) i) How is platin of pens prepared?
ii) Derive ideal gas equation. [3]
36. a) List the characteristics of internal energy. (OR) [2]
- b) Derive a general expression for the equilibrium constant K_C and K_C' for the reaction
 $3H_{2(g)} + N_{2(g)} \rightleftharpoons 2NH_{3(g)}$ [3]
37. a) Discuss the formation of O_3 molecule using MO Theory. (OR) [2]
- b) Describe the classification of organic compounds based on their structure. [3]
38. a) i) Explain inductive effect with suitable example.
ii) Describe optical isomerism with suitable example. [3]
- b) i) What are particulate pollutants?
ii) Suggest alkene (A) reacts with HCl to form compound (B). Compound (B) reacts with ammonia to form a compound (C) of molecular formula C_7H_7N . Compound (C) undergoes carbylamine test. Identify (A), (B) and (C). [3]