COMMON HALF YEARLY EXAMINATION - 2022

Standard XI

CHEMISTRY

Reg.No

Time: 3.00 hours

Marks: 70

Part - I

I Choose the correct answer 15 x 1 = 15

1. Which of the following compounds has / have percentage of carbon same as that in ethylene (C_2H_4)
   a) propene b) ethyne c) benzene d) ethane
2. Match the following :

   A. $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$
   B. 1s < 2s < 2p < 3s < 3p
   C. n = 1; l = 1; m = 0; s = $+\frac{1}{2}$
   D. $\Delta x . \Delta P \geq \frac{h}{4\pi}$

   a. Heisenberg's Uncertainty Principle
   b. Hund's Rule
   c. Aufbau principle
   d) Pauli Exclusion Principle

	A	B	C	D
a)	2	3	4	1
b)	2	1	4	3
c)	3	1	2	4
d)	3	2	1	4

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 meterorological 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

$2Na \xrightarrow{\text{dry ether}} C_4H_{10} + 2NaBr$

The above reaction is an example of which of the following

a) Reimer Tiemann reaction b) Wurtz reaction

c) Aldol condensation d) Hoffmann reaction

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 tetra chloride	2. Insecticide
C. CFC	3. Antiseptic
D. DDT	4. Refrigerants

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

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

15. The pH of normal rain water is

a) 6.5 b) 7.5 c) 5.6 d) 4.5

Part - II

II. Answer any 6 questions. (Q.No.24 is compulsory) 6 x 2 = 12

16. Calculate the molar mass of the following compounds i) $C_2H_5O_2$ ii) NaOH

17. State Pauli's exclusion principle

18. Give the uses of heavy water

19. Distinguish between diffusion and effusion

20. Write the K_p and K_c for the following reaction $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$

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

22. Give the IUPAC name of the following compounds

i) CH_3OCH_3 ii) $CH_2 = CH - CH = CH_2$

23. What are nucleophiles? Give suitable example

24. $3CH \equiv CH \xrightarrow[673\ K]{\text{Red hot iron tube}} ?$

Part - III

III. Answer any 6 questions. (Q.No.28 is compulsory) 6 x 3 = 18

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 351 K. The molar heat of vaporisation 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) Raschig process ii) Down process

33 What is Green chemistry?

Part - IV

5 x 5 = 25

IV. Answer all the questions.

34 a) State the Postulates of the Bohr's model of an atom. [5]

(OR)

b) i) How do you convert para hydrogen into ortho hydrogen? [3]

ii) Explain diagonal relationship. [2]

35 a) Explain the Pauling method for the determination of ionic radius. [5]

(OR)

b) i) How is plaster of paris prepared? [2]

ii) Derive ideal gas equation. [3]

36 a) List the characteristics of internal energy. [5]

(OR)

b) Derive a general expression for the equilibrium constant K_p and K_c for the reaction $3H_{2(g)} + N_{2(g)} \rightleftharpoons 2NH_{3(g)}$ [5]

37 a) Discuss the formation of O_2 molecule using MO Theory. [5]

(OR)

b) Describe the classification of organic compounds based on their structure. [5]

38 a) i) Explain inductive effect with suitable example. [3]

ii) Describe optical isomerism with suitable example. [2]

(OR)

b) i) What are persistent pollutants? [2]

ii) Simplest alkene (A) reacts with HCl to form compound (B). Compound (B) reacts with ammonia to form a compound (C) of molecular formula C_2H_7N. Compound (C) undergoes carbylamine test. Identify (A), (B) and (C). [3]
