

QUARTERLY EXAMINATION - 2023

CLASS: XI
CHEMISTRY

 Reg.No

Time : 3.00 Hours

MAX MARKS : 70

PART - I

Answer all the questions.
15x1=15

1. The equivalent mass of a trivalent metal element is 9 g e⁻¹ the molar mass of its anhydrous oxide is
 a) 102 g b) 27 g c) 270 g d) 78 g
2. **Assertion** : Number of radial and angular nodes for 3p orbital are 1,1 respectively
Reason : Number of radial and angular nodes depends only on principal quantum number
 a) both assertion and reason are true and reason is the correct explanation of assertion
 b) both assertion and reason are true and reason is not correct explanation of assertion
 c) assertion true but reason is false d) both assertion and reason is false
3. In a 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 of these
4. Ionic hydrides are formed by
 a) Halogens b) chalcogens c) inertgas d) Group one elements
5. What is the density of N₂ gas at 227°C and 5.00 atm pressure? (R=0.082 L atm K⁻¹ mol⁻¹)
 a) 1.40 g/L b) 2.81 g/L c) 3.41 g/L d) 0.29 g/L
6. In an adiabatic expansion of an ideal gas
 a) $W = -\Delta U$ b) $W = \Delta U + \Delta H$ c) $\Delta U = 0$ d) $W = 0$
7. -I effect is shown by
 a) -Cl b) -Br c) both (a) and (b) d) -CH₃
8. Functional group of ester is
 a) -COOH b) -COOR c) -COX d) -CHO
9. The boiling point of heavy water(D₂O) is
 a) 375.4K b) 373.4K c) 376.2K d) 374.4K
10. If K_b and K_f for a reversible reaction are 0.8×10^{-5} and 1.6×10^{-4} respectively, the value for equilibrium constant is
 a) 20 b) 0.2×10^{-1} c) 0.05 d) 0.2
11. which of the following is optically active?
 a) 3-Chloro pentane b) 2-Chloro propane c) Meso tartaric acid d) Glucose
12. What is hybridisation state of benzyl carbonium ion?
 a) sp² b) spd² c) sp³ d) sp² d
13. An engine operating between 127°C and 47°C what is the efficiency of engine.....
 a) 25% b) 20% c) 24% d) 23%
14. 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
15. Match the given in column I with suitable items given in column II

Column - I A) Electro negativity B) Hydrogen C) Metabolic study D) homolytic fission a) A-2, B-1, C-3, D-4 b) A-4, B-2, C-1, D-3	Column - II 1. fuel cell 2. Free radical 3. Nature of bond 4. Bomb calorimeter c) A-3, B-1, C-4, D-2 d) A-1, B-3, C-2, D-4
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 PG ASST IN CHEMISTRY
 Dharmapuri District.

PART-II**Answer any 6 questions : (Question no.24 is compulsory)****6X2=12**

16. Define Gram equivalent mass
17. Give the electronic configuration of Mn^{2+} and Cr^{3+}
18. Define modern periodic law
19. How is Tritium Prepared?
20. What is inversion temperature?
21. State third law of thermodynamics
22. Write the K_C and K_p Values for following equations.
 - i) $4NO_{(g)} + 6H_2O_{(g)} \rightleftharpoons 4NH_{3(g)} + SO_{2(g)}$
 - ii) $NO_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$
23. what are nucleophiles? Give Example.
24. Identify the possible isomerism exhibited by C_3H_8O with examples.

PART -III**Answer any 6 question (Q.No.33 is compulsory)****6X3=18**

25. Write short notes on Principal Quantum Number
26. Explain diagonal relationship
27. Write the use of heavy water
28. Write the critical constant values for V_c , T_c and P_c
29. List the characteristic of internal energy
30. State Le-chatlier principle
31. Explain geometrical isomerism in alkene by considering 2-butene as an example
32. write short notes on inductive effect
33. How much volume of chlorine is required to form 11.2 lit HCl at 273 k and 1 atm pressure?

PART -IV**Answer all the questions.****5X5=25**

34. a) A compound on analysis give Na=14.31% S=9.97% H=6.22%, O=69.5% calculate the molecular formula of the compound if all the hydrogen in the compound is present in combination with oxygen as water of crystallisation (molecular mass of the Compound=322)
(OR)
 - b) i) Explain Bohr atom model (3 m)
 - ii) State Hund's rule (2 m)
35. a) Explain the Pauling method for determination of ionic radii (5 m)
(OR)
 - b) i) What are isotopes? Write the name of isotopes of hydrogen (2 m)
 - ii) Explain ion exchange method (3 m)
36. a) i) State Graham's law (2 m)
ii) Write the relation between ΔH and ΔU (3 m)
(OR)
 - a) i) Define molar heat capacity give its unit (2 m)
 - ii) Derive ideal gas equation (3 m)
37. a) Derive the relation between K_p and K_c (OR) (5 m)
b) Explain paper chromatography. (3 m)
38. a) i) Explain electromeric effect (2 m)
ii) What is hyperconjugation effect (OR) (5 m)
b) Describe the reactions involved in the detection of nitrogen in an organic compound by Lassaigne's method. (5 m)

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PART - I

Answer all the questions.

UNIT-1 B.B. 15x1=15

1. The equivalent mass of a trivalent metal element is 9 g e⁻ the molar mass of its anhydrous oxide is
 a) 102 g b) 27 g c) 270 g d) 78 g

2. Assertion : Number of radial and angular nodes for 3p orbital are 1,1 respectively UNIT-2 B.B. 14

Reason : Number of radial and angular nodes depends only on principal quantum number

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

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

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

3. In a which of the following orders of ionic radii is correct? UNIT-3 B.B. 19

a) $H^+ > H > H^-$ b) $Na^+ > F^- > O^{2-}$ c) $F^- > O^{2-} > Na^+$ d) None of these

4. Ionic hydrides are formed by UNIT-4 B.B. 4
 a) Halogens b) chalcogens c) inertgas d) Group one elements

5. What is the density of N₂ gas at 227°C and 5.00 atm pressure? (R=0.082 L atm K⁻¹ mol⁻¹) UNIT-6 B.B. 23
 a) 1.40 g/L b) 2.81 g/L c) 3.41 g/L d) 0.29 g/L

6. In an adiabatic expansion of an ideal gas UNIT-7 B.B. 5
 a) $W = -\Delta U$ b) $W = \Delta U + \Delta H$ c) $\Delta U = 0$ d) $W = 0$

7. -I effect is shown by [UNIT-12 B.B. 9]
 a) -Cl b) -Br c) both (a) and (b) d) -CH₃

8. Functional group of ester is B.I [P.NO 115]
 a) -COOH b) -COOR c) -COX d) -CHO

9. The boiling point of heavy water (D₂O) is B.I [P.NO 107]
 a) 375.4K b) 373.4K c) 376.2K d) 374.4K

10. If K_b and K_f for a reversible reaction are 0.8×10^{-5} and 1.6×10^{-4} respectively, the value for equilibrium constant is [B.B. 1] UNIT-8

a) 20 b) 0.2×10^{-5} c) 0.05 d) 0.2

11. which of the following is optically active? UNIT 11 [B.B. 15]
 a) 3-Chloro pentane b) 2-Chloro propane c) Meso tartaric acid d) Glucose

12. What is hybridisation state of benzyl carbonium ion? B.I UNIT-11

a) sp² b) sp³ c) sp d) sp² d

13. An engine operating between 127°C and 47°C what is the efficiency of engine.... UNIT-7 B.I E.Y.5.

a) 25% b) 20% c) 24% d) 23%

14. Solubility of carbon dioxide gas in cold water can be increased by [B.B. 5] UNIT-8

a) increase in pressure b) decrease in pressure
 c) increase in volume d) None of these

15. Match the given in column I with suitable items given in column II

Column - I

- A) Electro negativity
 B) Hydrogen
 C) Metabolic study
 D) homolytic fission

Column - II

1. fuel cell
 2. Free radical
 3. Nature of bond
 4. Bomb calorimeter

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

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ONE MARK ANSWER KEY & COMPULSORY QUESTION ANSWER
PART-1

ANSWER ALL THE QUESTIONS.

1. a) 102 g
2. c) assertion true but reason is false.
3. d) None of these
4. d) Groups one elements
5. c) 3.41 g/L
6. a) $w = -\Delta U$
7. c) both (a) and (b)
8. b) $-\text{COOR}$
9. d) 374.4K
10. a) 20
11. d) Glucose
12. a) sp^2
13. b) 20 %
14. a) increase in pressure
15. c) A-3, B-1, C-4, D-2.

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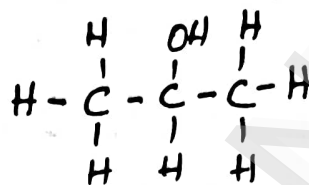
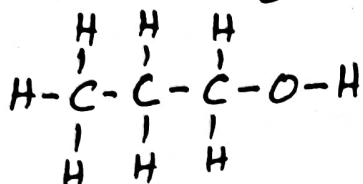
PART-II

Question no. 24 is compulsory.

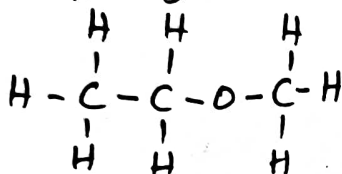
24. Identify the possible isomerism exhibited by C_3H_8O with example.

C_3H_8O have 3 Constitutional isomers.

i] 1 Propanol ($CH_3CH_2CH_2OH$) ii] 2 Propanol $CH_3CH(OH)CH_3$



iii] Ethyl - methyl Ether $CH_3CH_2OCH_3$



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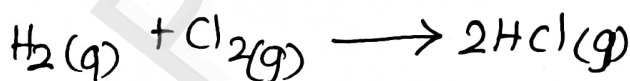
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PART-III

(Q.No 33 is compulsory.)

33. How much volume of chlorine is required to form 11.2 lit HCl at 273 K and 1 atm pressure?

Solution: The balance equation for the formation of HCl is



As per the stoichiometric equation, under given condition

To produce 2 mole HCl

1 mole of chlorine gas is required to produce

44.8 litres of HCl.

22.4 litres of chlorine gas are required.

To produce 11.2 litres of HCl

$$\frac{22.4 \text{ L } Cl_2}{44.8 \text{ L of HCl}} \times 11.2 \text{ L of HCl}$$

= 5.6 litres of chlorine are required.