

HMD 11 - Std

Time : 3.00 hrs.

HALF YEARLY EXAMINATION - 2022

CHEMISTRY

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Marks : 70

SECTION - I

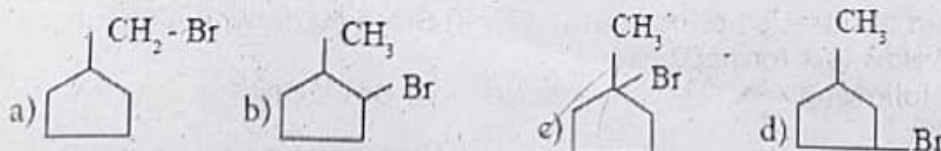
Note: 1) Answer all the questions.

2) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer.

15 X 1 = 15

- The equivalent mass of a trivalent metal element is 9 g eq^{-1} the molar mass of its anhydrous oxide is
 (a) 102 g (b) 27 g (c) 270 g (d) 78 g
- 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 but reason is not the correct explanation of assertion.
 (c) assertion is true but reason is false (d) both assertion and reason are false
- Which one of the following is the least electronegative element?
 a) Bromine b) Chlorine c) Iodine d) Hydrogen
- If a body of a fish contains 1.2 g hydrogen in its total body mass, if all the hydrogen is replaced with deuterium then the increase in body weight of the fish will be
 a) 1.2g b) 2.4g c) 3.6g d) $\sqrt{4.8} \text{ g}$
- In fireworks the red colour flash is produced by
 a) Ba b) Ra c) Sr d) Rb
- Maximum deviation from ideal gas is expected from
 a) $\text{CH}_4(g)$ b) $\text{NH}_3(g)$ c) $\text{H}_2(g)$ d) $\text{N}_2(g)$
- Which of the following always has a negative value
 a) heat of reaction b) heat of solution c) heat of combustion d) heat of formation
- 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
- Which of the following aqueous solutions has the highest boiling point ?
 a) 0.1M KNO_3 b) 0.1 M Na_3PO_4 c) 0.1 M BaCl_2 d) 0.1 M K_2SO_4
- Which one of the following has zero dipole moment
 a) HF b) H_2 c) CO d) NO
- Ortho and para-nitro phenol can be separated by
 a) azeotropic distillation b) destructive distillation
 c) steam distillation d) cannot be separated
- Enzyme present in apple is
 a) Poly phenol oxidase b) Poly phenol reductase
 c) Poly phenol d) Poly phenol hydrolase

13. In the following reaction  The major product obtained is



14. The name of $C_2F_4Cl_2$ is
 a) Freon - 112
 b) Freon - 113
 c) Freon - 114
 d) Freon - 115
15. The pH of normal rain water is
 a) 6.5
 b) 7.5
 c) 5.6
 d) 4.6

SECTION - II

Answer any six questions and question number 20 is compulsory.

6 X 2 = 12

16. Calculate the molar mass of the following compounds.
 i) Urea [$CO(NH_2)_2$] ii) Acetone [CH_3COCH_3]
 iii) Boric acid [H_3BO_3] iv) Sulphuric acid [H_2SO_4]
17. How do you convert para hydrogen into ortho hydrogen?
18. Can a Van der Waals gas with $a=0$ be liquefied? explain.
19. Explain intensive properties with two examples.
20. Define Gibbs free energy.
21. Linear form of carbon dioxide molecule has two polar bonds, yet the molecule has Zero dipole moment why?
22. Write a note on homologous series.
23. How does chlorobenzene react with sodium in the presence of ether? What is the name of the reaction?
24. Explain how oxygen deficiency is caused by carbon monoxide in our blood? Give its effect.

SECTION - III

Answer any six questions and question number 29 is compulsory.

6 x 3 = 18

25. Give the electronic configuration of Mn^{2+} and Cr^{3+}
26. Compare the structures of H_2O and H_2O_2
27. Discuss the similarities between beryllium and aluminium. (any six points)
28. Write down the Born-Haber cycle for the formation of $CaCl_2$.
29. Explain the effect of a added inert gas on the reaction at equilibrium.
30. Give the structure for the following compound. (i) 1,3,5- Trimethyl cyclohex - 1 -ene
 (ii) tertiary butyl iodide (iii) 2,2-dimethyl-1-chloropropane
31. What are electrophiles and nucleophiles? Give suitable examples for each.
32. How ozone reacts with 2-methyl propene?
33. Write any three contribution of green chemistry in our day to day life.

SECTION - IV

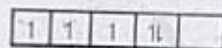
Answer all the questions.

5 x 5 = 25

34. A) i) Distinguish between oxidation and reduction (any 3 points) (3)
 ii) Calculate the number of moles present in 9 g of ethane. (2) (OR)
 B) i) How many radial nodes for 2s, 4p and 5d orbitals exhibit? How many angular nodes?(3)
 ii) Consider the following electronic arrangement for the d^5 configuration



(a)



(b)



(c)

- 1) which of these represents the ground state?
 2) which configuration has the maximum exchange energy (2)
35. A) i) Explain the following, give appropriate reasons.
 1) ionization potential of N is greater than that of O.
 2) the electron affinity values of Be and Mg are almost zero. (3) ii) State modern periodic law. (2)
 (OR) B) i) Give any four uses of Gypsum. (2) ii) Write the chemical equations for the reactions involved in solvay process of preparation of sodium carbonate. (3)
36. A) Derive the values of critical constants V_c and P_c from Vanderwaals equation of state. (5)
 (OR) B) i) Derive the relation between K_p and K_c . (3) ii) State Le-chatelier's principle. (2)
37. A) i) State and explain Henry's law. (3) ii) Define the term isotonic solutions. (2) (OR)
 B) Draw the MO diagram for oxygen molecule calculate its bond order and show that O_2 is paramagnetic. (5)
38. A) i) Describe the mechanism of nitration of benzene. (3) ii) State Markownikoff's rule (2) (OR)
 B) i) What is stone leprosy? How is it formed? (2)
 ii) Write short notes on the following a) Raschig process b) Dows process. (3)