Model Question Paper

PART - III

CHEMISTRY ENGLISH VERSION

Time Allowed:3 Hours **Max Marks: 150**

Note : i. Answer all the questions from Part -1

ii. Answer any fifteen questions from Part - II

iii. Answer any seven questions from Part-III covering all sections and choosing atleast two from each section.

iv. Answer question number 70 and any three from the remaining questions in Part IV.

v. Draw diagrams and write equations wherever necessary.

PART – I

Note : Answer all the questions **(30 x 1 = 30)**

Choose and write the correct answer

1. En = $-313.6/n^2$, If the value of Ei = -34.84 to which value ' n' corresponds to

   (a) 4 (b) 3 (c) 2 (d) 1

2. The bond order of nitrogen molecule is

   (a) 2.5 (b) 3 (c) 2 (d) 4

3. Noble gases have _____ electron affinity

   (a) High (b) Low (c) Zero (d) Very low

4. The shape of XeF_4 is

   (a) Tetrahedral (b) Octahedral

   (c) Square planar (d) Pyramidal

5. Copper is extracted from

   (a) Cuprite (b) Copper glance

   (c) Malachite (d) Copper Pyrites

6. Silver salt used in photography is

   (a) AgCl (b) $AgNO_3$ (c) AgF (d) AgBr

7. The most common oxidation state of **Lanthanides** is

   (a) +2 (b) +1 (c) +3 (d) +4

8. _____ is used in gas lamp material

   (a) MnO_2 (b) CeO_2 (c) N_2O_5 (d) Fe_2O_3

9. The geometry of $[Ni(CN)_4]^{2-}$ is

   (a) Tetrahedral (b) Square Planar (c) Triangular (d) Octahedral

10. Which of the following is used as neutron absorber in nuclear reactors?

    (a) Water (b) Deuterium (c) Uranium (d) Cadmium

11. The number of chloride ions present per unit of CsCl

    (a) 6 (b) 8 (c) 1 (d) 4

12. In an adiabatic process which of the following is correct?

(a), q=w (b) q=0 (c) $\Delta E=q$ (d) $P\Delta V=0$

13. When a liquid boils, there is

(a) an increase in entropy (b) a decrease in entropy

(c) an increase in heat of vapourisation

(d) an increase in free energy

14. State of Chemical equilibrium is

(a) Dynamic (b) Stationary (c) Both a&b (d) None

15. For an endothermic equilibrium reaction, if K_1 and K_2 are the equilibrium constants at T_1 and T_2 temperatures respectively and if $T_2>T_1$, then

(a) $K_1 < K_2$ (b) $K_1>K_2$ (c) $K_1 = K_2$ (d) None

16. The unit of zero order rate constant is

(a) sec^{-1} (b) mol lit^{-1} sec^{-1}

(c) mol sec^{-1} (d) lit^2 sec^{-1}

17. Oil soluble dye is mixed with emulsion and emulson remains colorless then, the emulsion is

(a) O/W (b) W/O (c) O/O (d) W / W

18. Colloids are purified by

(a) precipitation (b) Coagulation (c) Dialysis (d) Filtration

19. $Fe(OH)_3$ colloidal particles adsorb _____ ions

(a) Fe^{3+} (b) Mg^{2+} (c) Ca^{2+} (d) Cu^{2+}

20. Ostwald's dilution law is applicable to the solution of

(a) CH_3COOH (b) NaCl (c) NaOH (d) H_2SO_4

21. The reaction of Lucas reagent is fast with

(a) ethanol (b) methanol (c) 2-propanol (d) 2-methyl 2-propanol

22. An organic compound $C_4H_{10}O$ when heated with excess HI gives only one type of alkyl iodide. The Compound is

(a) diethylether (b) methyl n-propylether

(c) methyl iso propyl ether (d) n-butyl alcohol

23. When ether is exposed to air for sometime an explosive substance produced is

(a) Peroxide (b) Oxide (c) TNT (d) Superoxide

24. The compound that does not undergo Cannizzaro reaction is

(a) Formaldehyde (b) Acetaldehyde

(c) Benzaldehyde (d) Trimethyl Acetaldehyde

25. Which of the following is least acidic?

(a) C_2H_5OH (b) CH_3COOH (c) C_6H_5OH (d) $ClCH_2COOH$

26. Nitration of nitrobenzene results in

(a) O-dinitro benzene (b) 1,3,5-trinitro benzene

(c) p-dinitrobenzene (d) m-dinitrobenzene

27. Primary amine acts as

(a) Electrophile (b) Lewis base (c) Lewis acid (d) Free radical

28. Which of the following will not undergo diazotisation?

(a) m-toluidine (b) aniline (c) p-amino phenol (d) benzylamine

29. Important constituent of cell wall is

(a) Lipid (b) Cellulose (c) Protein (d) Vitamin

30. The most abundant carbohydrate is

(a) glucose (b) fructose (c) starch (d) cellulose

PART-II

Note : ***(15X3 = 45)***

(i) Answer any 15 questions.

(ii) Answer in one or two sentences :

31. State Heisenberg's uncertainity principle.

32. Mention the disadvantage of Pauling Scale.

33. What is plumbo solvency.

34. Write the uses of Neon.

35. Why transition elements form complexes?

36. What is the action of heat on copper sulphate crystals?

37. How many α and β particles will be emitted by an element $_{84}A^{218}$ is changing to a stable isotope of $_{82}B^{206}$?

38. What are superconductors?

39. Calculate the change of entropy for the process, water (liquid) water (vapour 373K) involving$\Delta H_{(vap)}$ = 40850J mol^{-1} 373K

40. State Lechatlier's principle.

41. Define half life period.

42. What are simple and complex reactions?

43. Why colloidal system of gas in gas does not exist?

44. State Faraday' s first law.

45. Distinguish enantiomers and diastereomers.

46. How is phenolphthalein prepared?

47. Explain the synthesis of glycerol from propylene.

48. Formaldehyde and benzaldehyde give Cannizzaro reaction but acetaldehyde does not account for this?

49. Formic acid reduces Tollen's reagent, but acetic acid does not. Give reason.

50. An organic compound (A) having molecular formula C_2H_7N is treated with nitrous acid to give (B) of molecular formula C_2H_6O which on mild oxidation gives compound (C) of molecular formula C_2H_4O which answers Tollens reagent test. Identify A, B, C.

51. Ilustrate with suitables the term 'Anaesthetics'.

PART - III

Note : ***(7 x 5 = 35)***

(i) Answer any Seven questions choosing at least two questions from each section.

Section - A

52. The approximate mass of an electron is 10^{-27}g. Calculate the uncertainty in its velocity. If the the uncertainity in its position were of the order of 10^{-11}m.

53. Explain the extraction of silver from its chief ore.

54. What is lanthanide contraction? Discuss its consequences.

55. Explain Co-ordination isomerism and ionisation isomerism with suitable examples.

Section - B

56. In the thermal decomposition of N_2O at 764°C, the time required to decompose half of the reactant was 263 seconds, when the initial pressure was 290 mm of Hg and 212 seconds at an initial pressure of 360 mm of Hg. What is the order of this reaction?

57. State the various statements of second law of Thermodynamics.

58. Derive the integrated Van't Hoff equation for an equilibrium reaction.

59. Derive Nernst equation.

Section - C

60. Distinguish between aromatic and aliphalic ethers.

61. Write notes on

    i) Perkin's reaction and

    ii) Knoevenagal reaction

62. Discuss the mechanism of bromination of salicyclic acid.

63. Explain briefly on characteristics of rocket propellants.

PART-IV

(4 x 10 = 40)

Note : Answer question number 70 and any three from the remaining questions.

64. (a) Write notes on Pauling's and Mulliken's Scale of Electronegativity. [5]
    (b) Give an account of the structure of ortho and cyclic silicates. [5]

65. (a) Explain Werners theory of coordination compounds. [5]

    (b) Explain the uses of radioactive isotopes with examples. [5]

66. (a) Write notes on any two point defects in Crystals [5]

    (b) Write notes on (i) Ultrafiltration and (ii) Helmholtz double layer [5]

67. (a) Derive Henderson Equation. [5]

    (b) Write notes on single electrode potential. [5]

68. (a) Which conformation of cyclohexanol forms intermolecular hydrogen bonding more easily? Explain. [5]

    (b) How are the following conversions carried out?

    (i) Salicylic acid $\rightarrow$ aspirin

    (ii) Salicyclic acid $\rightarrow$ methylsalicylate

    (iii) lacticacid $\rightarrow$ lactide

69. (a) How can the following conversions be effected? [5]

i. Nitrobenzene to anisole

ii. Chlorobenzene to phenyl hydrazine

iii. Aniline to Benzoic acid

(b) Mention the biological functions of nucleic acids [5]

70. (a) An organic compound A ($C_7H_6O_2$) reacts with NH_2OH forming a crystalline compound. On warming with NaOH it forms two compounds B and C. 'B' is neither soluble in NaOH nor in HCl but can be oxidised to A. The compound 'C on treatment with Con. HCl forms acid 'D' which on treating with soda lime gives 'phenol'. Identify A to D. [5]

(b) Chief ore of chromium (A) on roasting with Sodium carbonate gives compound (B) and (C). B on acidification gave compound (D) which on treatment with KCl gave compound (E). Identify the compounds A, B,C,D and E. Explain with proper chemical reactions. [5]

(OR)

(c) An organic compound A (C_6H_6O) gives maximum of two isomers B and C when an alkaline solution of 'A' is refluxed with chloroform at 333K. 'B' on oxidation gives an acid D. The acid 'D' is also obtained by treating sodium salt of A with CO_2 under pressure. Identify the compounds A, B, C and D and explain with proper chemcial reactions. [5]

(d) Calculate the pH of O.IM CH_3COOH Solution Disassociation constant of acetic acid is 1.8×10^{-5}M. [5]