Std : XII **CHEMISTRY** **Marks : 150**

Date : **Time : 3 Hrs.**

Part - I

N.B. (i) Answer all the questions ***30 x 1= 30***

(ii) Choose and write the correct answer

(iii) Each question carries one mark

1. The intramolecular hydrogen bonding is present in
   a) o- nitrophenol b) m - nitro phenol c) p - nitrophenol d) none
2. The de - Broglie wavelength of a particle of mass 6.625×10^{-31} kg moving with a velocity 2×10^{7} m/s is
   a) 5Å b) 5×10^{-11} m c) 5×10^{-9} m d) 5×10^{-8} m
3. Among the following which has the maximum ionization energy.
   a) Alkali elements b) Alkaline earth elements
   c) Halogens d) Noble gases
4. Which shows only -1 oxidation state?
   a) fluorine b) bromine c) chlorine d) iodine
5. Which of the following compounds is not coloured?
   a) Na_2CuCl_4 b) Na_2CdI_4 c) $K_4[Fe(CN)_6]$ d) $K_3[Fe(CN)_6]$
6. Which is called a philosopher's wool?
   a) ZnO b) $ZnCO_3$ c) $AgNO_3$ d) $CuSO_4$
7. Maximum oxidation state exhibited by Lanthanides is
   a) + 1 b) + 2 c) + 3 d) + 4
8. Which of the following isotope is used as a power source in long mission space probes?
   a) U - 235 b) Pu - 239 c) Pu - 238 d) U - 238
9. The geometry of $[Cu(NH_3)_4]^{2+}$ complex ion is
   a) linear b) tetrahedral c) square planar d) angular
10. $_{92}U^{235}$ nucleus absorbs a neutron and disintegrates into $_{54}Xe^{139}$, $_{38}Sr^{94}$ and X. What will be the product X?
    a) 3 neutrons b) 2 neutrons c) α particle d) β particle
11. An example of metal deficiency defect is
    a) NaCl b) AgCl c) CsCl d) FeS
12. For the reaction $2Cl_{(g)} \rightarrow Cl_{2(g)}$, the signs of ΔH and ΔS respectively are
    a) +, - b) +, + c) -, - d) -, +
13. The entropy change involved in the process of $H_2O_{(s)} \rightarrow H_2O_{(l)}$ at 0^oC and 1atm pressure involving $\Delta H_{fusion} = 6008$ J mole^{-1} is
    a) 22.007 J mol^{-1}K^{-1} b) 22.7 J mol^{-1}K^{-1} c) 220.07 J mol^{-1}K^{-1} d) 2.2007 J mol^{-1}K^{-1}
14. An equilibrium reaction is endothermic if K_1 and K_2 are the equilibrium constants at T_1 and T_2 temperature respectively and if T_2 is greater than T_1 then
    a) K_1 is less than K_2 b) K_1 is greater than K_2
    c) K_1 is equal to K_2 d) none
15. Which of the following gaseous equilibrium is favoured by increase in pressure?
    a) $N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$ b) $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$
    c) $2SO_{3(g)} \rightleftharpoons 2SO_{2(g)} + O_{2(g)}$ d) both 'a' and 'c'

16. A first order reaction completes 90% in 30 minutes then the time required to complete 99% of the reaction is
a) 30 min b) 60 min c) 45 min d) 15 min

17. An emulsion is a colloidal solution of
a) two solids b) two liquids c) two gases d) one solid and one liquid

18. Which of the following is used for purifying water?
a) Ferric chloride b) Alum c) Argyrol d) Backing soda

19. The decomposition of H_2O_2 is decreased in the presence of
a) Glycerine b) Alcohol c) Platinum d) As_2O_3

20. The specific conductance of a 0.01 M solution of KCl is 0.0014 ohm^{-1} cm^{-1} at 25°C Its equivalent conductance is
a) 14 ohm^{-1} cm^2 eq^{-1} b) 140 ohm^{-1} cm^2 eq^{-1} c) 1.4 ohm^{-1} cm^2 eq^{-1} d) 0.14 ohm^{-1} cm^2 eq^{-1}

21. When alcohols are converted to alkyl chlorides by thionyl chloride in presence of pyridine, the intermediate formed is
a) sulphonium ion b) chlorosulphonic acid c) alkyl chlorosulphite d) chlorosulphite

22. When ethyl iodide is treated with dry silver oxide it forms
a) ethyl alcohol b) diethylether c) silver ethoxide d) ethylmethyl ether

23. Which one of the following ethers is used in perfumery?
a) dimethyl ether b) diethyl ether c) diphenyl ether d) methyl phenyl ether

24. The chain isomer of 2 - methyl propanal is
a) 2 - butanone b) butanal c) 2 - methyl propanol d) but - 3 - ene - 2 - ol

25. The compound which undergoes intramolecular dehydration with P_2O_5 is
a) acetic acid b) formic acid c) propionic acid d) butyric acid

26. The basic character of amines is due to the
a) tetrahedral structure b) presence of nitrogen atom
c) lone pair of electrons on nitrogen atom d) high electronegativity of nitrogen

27. Electrolytic reduction of nitro benzene gives.
a) aniline b) nitroso benzene c) p - amino phenol d) p - nitro phenol

28. Which of the following compound on reduction gives a secondary amine?
a) Nitromethane b) Acetamide c) Methyl cyanide d) Methyl iso cyanide

29. In sucrose, glucose and fructose units are linked through
a) α - glycosidic linkage b) β- glycosidic linkage
c) peptide linkage d) ester linkage

30. Glucose is not oxidised to gluconic acid by
a) Br_2/H_2O b) Fehling solutions c) Tollen's reagent d) Conc. HNO_3

Part - II

N.B.: (i) Answer any FIFTEEN questions 15 x 3 = 45
(ii) Each question carries three marks

31. Define hybridization.
32. Define electronegativity. Mention the periodic variation of it along the period and down the group.
33. What is Holme's signal?
34. What are interhalogen compounds? How are they formed?
35. Explain why d – block elements exhibit variable oxidation state?
36. What is spitting of silver? How is it prevented?

37. Calculate the number of neutrons in the remaining atom after emission of an α particle from $_{92}X^{238}$ atom. also report the mass number and atomic number of the product atom.
38. What is meant by super conducting transition temperature?

39. Calculate the maximum efficiency % possible from a thermal engine operating between 110°C and 25°C.
40. Define reaction quotient.
41. What is pseudo first order reaction? Give an example.
42. What is meant by activation energy?
43. What is Brownian movement?
44. What is electrochemical equivalent? Mention its unit.
45. Distinguish racemic mixture and mesoform.
46. How is allyl alcohol obtained from Glycerol?
47. How will you prepare phenolphthalein from phenol?
48. Write the tests to identify aldehyde.
49. Formic acid reduces Tollen's reagent, but acetic acid does not. Give reasons.
50. How is chloropicrin prepared? Give its use.
51. What are antipyretics? Give examples.

Part - III

N.B. : (i) Answer any SEVEN questions covering all sections 7 x 5 = 35

(ii) Choosing at least two questions from each section.

SECTION - A

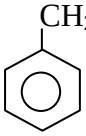
52. Discuss the Davisson and Germer experiment.
53. Briefly explain the extraction of zinc from zinc blende.
54. What are the consequences of Lanthanide contraction?
55. Explain Werner's theory of co-ordination compounds.

SECTION - B

56. What are the characteristics of Gibb's free energy?
57. Derive expressions for Kp and Kc for the decomposition of PCl_5.
58. What are the characteristics of order of reaction?
59. Calculate the e.m.f. of the cell having the cell reaction.

    $2Ag^+ + Zn \rightleftharpoons 2Ag + Zn^{2+}$ $E^0_{cell} = 1.56$ at 25°C when concentration of $Zn^{2+} = 0.1$ M and $Ag^+ = 10$ M in the solution.

SECTION - C

60. Distinguish between aromatic ether and aliphatic ether.
61. Explain the mechanism of aldol condensation of CH_3CHO.
62. How is Benzoic acid prepared from ***a)***  ***b)*** Phenyl cyanide ***c)*** Carbondioxide
63. Explain chromophore and auxochrome theory with suitable example?

Part – IV

N.B. : (i) Question No. 70 is compulsory 4 x 10 = 40

(ii) Answer any ***THREE from the remaining questions***

64. ***a)*** Explain the factors affecting electron affinity.

b) What are silicones? How are they prepared?

65. ***a)*** Explain co-ordination and ionization isomerism with suitable examples.

b) How are radioactive isotopes useful in medicine?

66. ***a)*** Explain Schottky and Frenkel defects.

b) Explain Intermediate compound formation theory.

67. ***a)*** Explain Ostwald's theory of indicators?

b) How is emf of a half cell determined?

68. ***a)*** Explain Optical isomerism involved in tartaric acid.

b) How are the following conversions carried out?

i) Succinic acid $\rightarrow$ Succinimide ***ii)*** Salicylic acid $\rightarrow$ Methyl salicylate

iii) Lactic acid $\rightarrow$ Lactide

69. ***a)*** Write a short note on ***i)*** Carbylamine reaction ***ii)*** Mustard oil reaction ***iii)*** Gabrial phthalimide reaction

b) How do you deduce the structure of Fructose?

70. ***a)*** An organic compound 'A' of molecular formula C_6H_6O gives violet colour with neutral $FeCl_3$. Compound 'A' on treatment with metallic Na gives compound B. Compound B on treatment with CO_2 followed by hydrolysis gives 'C'. Compound 'A' on treatment with $C_6H_5N_2Cl$ gives the compound 'D' which is a red dye. Identify A, B, C and D and explain the reactions.

b) Compound 'A' is the chief ore of chromium. 'A' on roasting with sodium carbonate in the presence of excess of air gives a water soluble compound 'B'. 'B' on acidification gives compound 'C'. Which on treatment with KCl gives compound 'D'. Identify the compounds A, B, C and D. Explain the reactions involved.

(or)

c) An organic compound 'A' of molecular formula C_7H_6O reduces Tollen's reagent. 'A' on treatment with NaOH gives compound B and 'C'. 'C' on heating with sodalime gives compound 'D'. Identify A, B, C and D. Explain the reactions involved.

d) Calculate the pH of 0.1 M CH_3COOH solution. Dissociation constant of acetic acid is 1.8×10^{-5} M.

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Padasalai's Centum Coaching Team

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