MT-03

01. $x_1 = A_1 \sin \omega t$, $y = x_2 = A_2 \cos \omega t$ Hence $\frac{x_1^2}{A_1^2} + \frac{y^2}{A_2^2} = 1$. ellipse.

02. $27°C = 300K$ & 327 is $600K$ & $V_{rms} \propto \sqrt{T}$ Hence $200.\sqrt{2} = 282.8\ ms^{-1}$ (no need to calculate)

03. formula (B)

04. $\rho_2 = \frac{M}{V_2} = \frac{M}{V_1 + \Delta V}$ (as due to ↑ in P vol will ↓)

$= \frac{M/V_1}{V_1(1 - \frac{\Delta V}{V})}$ now $\Delta P = B.\frac{\Delta V}{V}$ $\therefore \frac{\Delta V}{V} = (n-1)\frac{P}{B}$ $(\Delta P = P_2 - P_1 = nP_0 - P_0)$

$= \frac{\rho}{1 - \frac{(n-1)P}{B}} = \frac{\rho B}{B - (n-1)P}$ (A).

05. Given $\frac{1}{2}k_1x_1^2 = \frac{1}{2}k_2x_2^2 \Rightarrow \frac{x_1}{x_2} = \frac{\sqrt{k_2}}{\sqrt{k_1}}$ and

$F_1 = k_1x_1$ & $F_2 = k_2x_2 \Rightarrow \frac{F_1}{F_2} = \frac{k_1}{k_2}.\frac{x_1}{x_2} = \frac{k_1}{k_2}.\frac{\sqrt{k_2}}{\sqrt{k_1}}$

Hence $\frac{F_1}{F_2} = \frac{\sqrt{k_1}}{\sqrt{k_2}}$.

06. $g = \frac{GM}{R^2} = \frac{G.\frac{4}{3}\pi R^3 \rho}{R^2} = \frac{4G\pi\rho}{3}.R$ $\therefore \frac{g_1}{g_2} = \frac{\rho_1 R_1}{\rho_2 R_2}$

07. If $\bar{E}$ & $\bar{B}$ are along j & k then EM is along i i.e. space varriable will be "x" (with -ve).

08. $\frac{I_0}{\sqrt{2}} \rightarrow I_0$ will be in $\frac{T}{8}$ hence $\frac{1}{8 \times 50} = 2.5 \times 10^{-3}$ s.

09. $e = \frac{1}{2}B\omega L^2 = \frac{1}{2}.(0.1)(100)^2(0.5)^2 = 1.25\ V$

10. (1)

11. We have $I = n.e\,A\,V_d = \frac{V}{R} = n.e.A.V_d$ but $R = \frac{\rho L}{A}$

$\therefore \frac{V}{L}\frac{(A)}{(\rho)} = neA.V_d$ $\therefore E = n.e.\rho.V_d$ $\therefore V_d \propto E$

12. (D);

13. $x = 36t \therefore V_x = 36$; $Y = 48t - 4.9t^2 \therefore V_y = 48 - 9.8t$

at $t = 0$ $V_x = 36$, $V_y = 48$, $u = \sqrt{V_x^2 + V_y^2} = 60$

14. $KE = \frac{1}{2}mv^2 \therefore mE = \frac{1}{2}m^2v^2 \therefore p^2 = 2mE$ & $P = \sqrt{2mE}$

$$\frac{P_1}{P_2} = \frac{\sqrt{2mE}}{\sqrt{2.(4m).E}} = \frac{1}{2}$$

15. $V_e = \sqrt{\frac{2GM}{R}}$, Energy when projected from platform $= -\frac{GMm}{2R} \therefore BE = \frac{GMm}{2R}$

$\therefore$ escape velo. from surface $= \frac{1}{2}mV_e'^2 = \frac{GMm}{2R}$

$\therefore V_e' = \sqrt{\frac{GM}{R}} = \frac{1}{\sqrt{2}} \cdot Ve$ Hence $K = \frac{1}{\sqrt{2}}$

16. Here solenoide means an inductor, in case I

$R = \frac{V}{I} = \frac{12}{2} = 6A$; now for ac, $Z = \frac{12}{1} = 12\ A$

$Z^2 = R^2 + X_L^2 \Rightarrow 12^2 = 6^2 + X_L^2 \therefore X_L = 6\sqrt{3}\ \Omega$ now

$X_L = L(2\pi f) \Rightarrow 6\sqrt{3} = 2.\pi.50.L \therefore L = \frac{6\sqrt{3}}{100\pi} = 33mH$

17. $I = 2A$; as wattless it is either inductor or capacitor circuite & $I_{WL} = I_{rms}\sin\phi$

$\therefore \sqrt{3} = 2\sin\phi \Rightarrow \phi = 60^\circ \therefore$ power factor $\cos\phi = \frac{1}{2}$

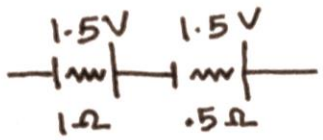
18. $P = \frac{V_0}{\sqrt{2}} \cdot \frac{I_0}{\sqrt{2}} \cdot \cos\phi = \frac{(100)(100\times10^{-3})}{2} \cdot \cos60^\circ = 2.5\ W.$

19. for electron $\lambda = \frac{h}{mv} = \frac{h}{\sqrt{2mE_{KE}}} \therefore \lambda' = \lambda/\sqrt{3}$

20. Using $m_1v_1 = m_2v_2 \Rightarrow \frac{m_2}{m_1} = \frac{8}{1} \therefore \frac{\text{Vol. of 2}}{\text{Vol of 1}} = \frac{8}{1} \Rightarrow \frac{r_2}{r_1} = \frac{2}{1}$

$\therefore r_1 : r_2 :: 1 : 2$

21. (3)

22. 

as total emf = 3V & $R_T = 1.5\Omega$ hence current $= \frac{3}{1.5} = 2A$ 03

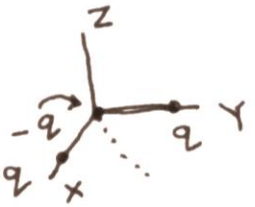
$V_1 - V_2 = E - ir \therefore \Delta V = 1.5 - 1.(1) = 0.5$

23. $R = \rho\frac{L}{A}$ hence (A). $\left(\frac{50}{.5^2}, \frac{100}{1^2}, \frac{200}{2^2}, \frac{300}{3^2}\right)$

24. $I = \frac{V}{Z} = \frac{10}{\sqrt{2}R}$ $(as\ X_L = R)$; $V_L = I.X_L = I.R = \frac{10}{\sqrt{2}R}.R = 5\sqrt{2}V$

25. $10/\sqrt{2}\ V$

$(0,a,0)_q$; $(0,0,0)_{-q}$; $(a,0,0)_q$



$\sqrt{2}q.a$ along vector joining (000), (a,a,0) q

26. Charge by smaller sph $\Rightarrow 120 = \frac{k.Q}{2}$ & pot. of outer sph $= \frac{kQ}{6}$

Hence $V = \frac{120}{3} = 40V$.

27. $\bar{E} = -(\nabla V) = -\left(\frac{\partial V}{\partial x}i + \frac{\partial V}{\partial y}j + \frac{\partial V}{\partial z}k\right) = -\left((6-8y)i + (-8x-8+6z)j + 6yk\right)$

at (1,1,1) $\bar{E} = 2i + 10j - 6k$ Hence $\bar{F} = qE = 2(2i + 10j - 6k)$

$= 4\sqrt{35}\ N$

28. $\frac{n}{n+1}mgR$. (Very std. formula), 29. attraction $\bar{r}$ (c),

30. (c) formula.

31. Here error pattern can not be used 21% is NOT error.

$T \equiv \sqrt{l}$ let l changes from $100 \to 121$ so T from $10 \to 11$

means 10%.

32. Pressure $= \frac{3000 \times 9.8}{425 \times 10^{-4}} = 6.9 \times 10^5$ Hence (A) By Pascal's law

33. (D) as $\lambda \uparrow$; 34. (B)

35. 

$mg.\frac{R}{2} = mg.\frac{2u^2\sin\theta.\cos\theta}{2g}$

$= mu^2\sin\theta.\cos\theta$ (B)

36. $\frac{T-42}{110} = \frac{T-72}{220} \therefore T = 12$

37. $\perp$ distance of $y-x-2=0$ from $(0,0)$ is $p = \left|\frac{1.0-1.0-2}{\sqrt{1^2+1^2}}\right| = \sqrt{2}$

Hence angular momentum $= 1.2.\sqrt{2}$ (B).

38. (A). 39. Area of trapezium $= \frac{1}{2}(3+6).3 = 13.5\ J$

~~39~~40. $qvB = \frac{mv^2}{r} \therefore r = \frac{mv}{qB} \therefore$ as v is doubled r is doubled $= 4$

41. P.H $\therefore m(v\cos 45)\left(\frac{v^2\sin^2 45^\circ}{2g}\right) = \frac{m.v}{\sqrt{2}}.\frac{v^2}{2g.2} = \frac{mv^3}{4\sqrt{2}g}$

42. (B) extrinsic. 43. $\delta = (\mu-1).A \Rightarrow \mu - 1 = \frac{2}{8} \Rightarrow \mu = 1.25$

~~44~~ $\frac{1}{f} = (\mu-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right) \therefore \frac{1}{f} = (1.5-1)\left(\frac{1}{20} - \frac{1}{-30}\right) = 0.5\ \frac{5}{60} = \frac{1}{24}$

~~45~~. $\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \therefore \frac{1}{30} - \frac{1}{-25} = \frac{11}{150} \therefore f = \frac{150}{11} = 13.6 \approx 14\ cm$

46. $g = \frac{G.M}{R^2}$ $R_M = R_E/4$ & $M_M = M_E/80 \therefore g_M = g_E.\frac{1/80}{(1/4)^2} = \frac{16}{80} = \frac{1^{th}}{5}$

$\therefore 2\ m/s^2$

47. $c = \frac{E_0}{B_0} \therefore B_0 = \frac{9.3}{3\times10^8} = 3.1\times10^{-8}\ T$

48. (C), 49. (D)

50. $E_n = \frac{13.6}{n^2}\ eV$, $E_1 = -13.6\ eV$; $E_2 = \frac{-13.6}{4} = -3.4\ eV$

Hence $E_2 - E_1 = 10.2 = ~~h\nu = eV_s +~~$ $V_0 = V_s = 3.57V$

$\therefore \phi_0 = 10.2 - 3.57 = 6.63\ eV$, $\nu_0 = \frac{6.63}{h}$

$= \frac{6.63\times1.6\times10^{-19}}{6.63\times10^{-34}} = 1.6\times10^{15}\ Hz$

CHEMISTRY (SECTION – A)

51. 8 litre of H_2 and 6 litre of Cl_2 are allowed to react to maximum possible extent. Find out the final volume of reaction mixture. Suppose P and T remains constant throughout the course of reaction -

(a) 7 litre (b) 14 litre (c) 2 litre (d) None of these.

Sol. (B)

$$H_2 + Cl_2 \rightarrow 2\,HCl$$

Volume before reaction	8 lit	6 lit	0
Volume after reaction	20	12	

$\therefore$ Volume after reaction

= Volume of H_2 left + Volume of HCl formed

= 2 + 12 = 14 lit

52. Oxygen contains 90% O^{16} and 10% O^{18}. Its atomic mass is

(a) 17.4 (b) 16.2 (c) 16.5 (d) 17

Solution: (b) Average atomic mass of oxygen $= \dfrac{90 \times 16 + 10 \times 18}{100} = 16.20$

53. Atomic weight of *Ne* is 20.2. *Ne* is a mixutre of Ne^{20} and Ne^{22}. Relative abundance of heavier isotope is

(a) 90 (b) 20 (c) 40 (d) 10

Solution:(d)

Average atomic weight/ The average isotopic weight

$$= \frac{\%\text{ of 1st isotope} \times \text{relative mass of 1st isotope} + \%\text{ of 2nd isotope} \times \text{relative mass of 2nd isotope}}{100}$$

$$\therefore\ 20.2 = \frac{a \times 20 + (100 - a) \times 22}{100};$$

$\therefore\ a = 90$; per cent of heavier isotope $= 100 - 90 = 10$

54. What is the maximum number of electrons in an atom that can have the quantum numbers n = 4, m = +1 ?

(a) 4 (b) 15 (c) 3 (d) 6

55. The work done in ergs for the reversible expansion of one mole of an ideal gas from a volume of 10 litres to 20 litres at 25° C is

(a) $2.303 \times 298 \times 0.082 \log 2$ (b) $-298 \times 10^7 \times 8.31 \times 2.303 \log 2$

(c) $2.303 \times 298 \times 0.082 \log 0.5$ (d) $2.303 \times 298 \times 2 \log 2$

Solution:(b)

$$w = -2.303\,nRT \log \frac{V_2}{V_1}$$

$$= -2.303 \times 1 \times 8.31 \times 10^7 \times 298 \log \frac{20}{10}$$

$$= -298 \times 10^7 \times 8.31 \times 2.303 \log 2$$

56. If ΔH_f^0 for H_2O_2 and H_2O are $-188 kJ/mole$ and $-286 kJ/mole$. What will be the enthalpy change of the reaction $2H_2O_2(l) \rightarrow 2H_2O(l) + O_2(g)$

(a) $-196 kJ/mole$ (b) $146 kJ/mole$ (c) $-494 kJ/mole$ (d) $-98 kJ/mole$

Solution:(a)

$H_2 + O_2 \rightarrow H_2O_2$; $\Delta H_f^0 = -188 kJ/mole$

$H_2 + \frac{1}{2}O_2 \rightarrow H_2O$ $\Delta H_f^0 = -286 kJ/mole$

$\Delta H = \Delta H^0_{(product)} - \Delta H^0_{(Reactants)}$

$= (2 \times -286) - (2 \times -188) = -572 + 376 = -196$

57. In the reversible reaction $A + B \rightleftharpoons C + D$, the concentration of each C and D at equilibrium was 0.8 *mole/litre*, then the equilibrium constant K_c will be

(a) 6.4 (b) 0.64 (c) 1.6 (d) 16.0

Solution: (d)

Suppose 1 *mole* of A and B each taken then 0.8 *mole/litre* of C and D each formed remaining concentration of A and B will be (1 – 0.8) = 0.2 *mole/litre* each.

$$K_c = \frac{[C][D]}{[A][B]} = \frac{0.8 \times 0.8}{0.2 \times 0.2} = 16.0$$

58. The dissociation constant of a weak acid is 1.0×10^{-5}, the equilibrium constant for the reaction with strong base is

(a) 1.0×10^{-5} (b) 1.0×10^{9} (c) 1.0×10^{7} (d) 1.0×10^{14}

Solution: (b)

$HA \rightleftharpoons H^+ + A^-$; $K_a = \frac{[H^+][A^-]}{[HA]}$ .....(i)

Neutralization of the acid with strong base is

$HA + OH^- \rightleftharpoons A^- + H_2O$; $K = \frac{[A^-]}{[HA][OH^-]}$ .....(ii)

Dividing (i) and (ii)

$\frac{K_a}{K} = [H^+][OH^-] = K_w = 10^{-14}$ or $K = \frac{10^{-5}}{10^{-14}} = 10^9$

59. The value of K_w is 9.55×10^{-14} at a certain temperature. Calculate the *pH* of water at this temperature.

(a) 6.51 (b) 9.73 (c) 2.82 (d) 4.96

Solution: (a)

Here we are given, $K_w = 9.55 \times 10^{-14}$

Now, as for water, $[H^+] = [OH^-]$

$\therefore$ $K_w = [H^+][OH^-] = [H^+].[H^+] = [H^+]^2$

i.e., $[H^+]^2 = 9.55 \times 10^{-14}$ or $[H^+] = \sqrt{9.55 \times 10^{-14}} = 3.09 \times 10^{-7} M$

$\therefore$ $pH = -\log[H^+] = -\log(3.09 \times 10^{-7})$

$= -[\log 3.09 + \log 10^{-7}] = -[0.49 - 7] = 6.51$

60. Oxidation number of Fe in Fe_3O_4 is fractional because-

(a) It is a mixed [Fe(+2), Fe(+4)] oxide (b) It is a non-stoichiometric compound
(c) It is a mixed [Fe(+2), Fe(+3)] oxide (D) None of the above

61. A solution has 25% of water, 25% ethanol and 50% acetic acid by mass. The mole fraction of each component will be

(a) 0.50, 0.3, 0.19 (b) 0.19, 0.3, 0.50 (c) 0.3, 0.19, 0.5 (d) 0.50, 0.19, 0.3

Solution: (d) Since $18\,g$ of water = 1mole

$25\,g$ of water = $\frac{25}{18} = 1.38$ mole

Similarly, $46\,g$ of ethanol = 1 mole

$25\,g$ of ethanol $= \frac{25}{46} = 0.55$ moles

Again, $60\,g$ of acetic acid = 1 mole

$50\,g$ of acetic acid $= \frac{50}{60} = 0.83$ mole

$\therefore$ Mole fraction of water $= \frac{1.38}{1.38 + 0.55 + 0.83} = 0.50$

Similarly, Mole fraction of ethanol $= \frac{0.55}{1.38 + 0.55 + 0.83} = 0.19$

Mole fraction of acetic acid $= \frac{0.83}{1.38 + 0.55 + 0.83} = 0.3$

62. What is the molality of solution of a certain solute in a solvent if there is a freezing point depression of 0.184^o and if the freezing point constant is 18.4

(a) 0.01 (b) 1 (c) 0.001 (d) 100

Solution: (a)

$$\Delta T_f = K_f \times m \text{ or } m = \frac{\Delta T_f}{K_f} = \frac{0.184}{18.4} = 0.01$$

63. When electricity is passed through the solution of $AlCl_3$, 13.5 *gm* of *Al* are deposited. The number of Faraday must be

(a) 0.50 (b) 1.00 (c) 1.50 (d) 2.00

Solution (c)

Eq. of $Al = \frac{13.5}{27/3} = 1.5$; Thus 1.5 Faraday is needed.

64. The resistance of 0.01 *N* solution of an electrolyte was found to be 210 Ohm at 298 *K*. Its conductance is,

(a) $4.76 \times 10^{-3}\,mho$ (b) $4.76\,mho$ (c) $210\ mho$ (d) None of these

Solution: (a)

Conductance $= \frac{1}{R} = \frac{1}{210} = 4.76 \times 10^{-3}\,mho.$

65. For the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$, if $\frac{\Delta[NH_3]}{\Delta t} = 2\times10^{-4} mol\, l^{-1}s^{-1}$, the value of $\frac{-\Delta[H_2]}{\Delta t}$ would be

(a) $1\times10^{-4} moll^{-1}s^{-1}$ (b) $3\times10^{-4} mol\, l^{-1}s^{-1}$ (c) $4\times10^{-4} moll^{-1}s^{-1}$ (d) $6\times10^{-4} mol\, l^{-1}s^{-1}$

Solution: (b)

$$N_2 + 3H_2 \rightleftharpoons 2NH_3$$

$$\frac{-\Delta[N_2]}{\Delta t} = -\frac{1}{3}\frac{\Delta[H_2]}{\Delta t} = \frac{1}{2}\frac{\Delta[NH_3]}{\Delta t};$$

$$\therefore \frac{\Delta[H_2]}{\Delta t} = \frac{3}{2}\times\frac{\Delta[NH_3]}{\Delta t} = \frac{3}{2}\times 2\times10^{-4}$$

$$= 3\times10^{-4} mol\, l^{-1}s^{-1}.$$

66. The half-life for the reaction, $N_2O_5 \rightleftharpoons 2NO_2 + \frac{1}{2}O_2$ in 24 hrs. at 30^oC. Starting with $10g$ of N_2O_5 how many grams of N_2O_5 will remain after a period of 96 *hours*

(a) $1.25g$ (b) $0.63g$ (c) $1.77g$ (d) $0.5g$

Solution : (b)

$$k = \frac{0.693}{t_{1/2}} = \frac{0.69}{24} = \frac{2.303}{96}\log_{10}\frac{1}{(a-x)} \quad \text{Or } \log\frac{10}{(a-x)} = 1.2036 \text{ or } 1-\log(a-x) = 1.2036$$

Or $\log(a-x) = -0.2036$; $(a-x) = 0.6258g$

67. The correct order of increasing size is -

(A) $Mg^{2+} < Na^{+} < F^{-} < Al$ (B) $F^{-} < Al < Na^{+} < Mg^{2+}$

(C) $Al < Mg^{2+} < F^{-} < Na^{+}$ (D) $Na^{+} < Al < F^{-} < Mg^{2+}$

68. Which is most acidic oxide ?

(A) Cl_2O (B) ClO_2 (C) Cl_2O_6 (D) Cl_2O_7

69. Choose the molecules in which hybridisation occurs in the ground state:

(1) BCl_3 (2) NH_3 (3) PCl_3 (4) BeF_2

The correct answer is:

(A) 1, 2, 4 (B) 1, 2, 3 (C) 2, 3 (D) 3, 4

70. Which of the following compound does not follow octet rule:

(A) CO_2 (B) PCl_3 (C) ICl (D) ClF_3

71. Which of the following is the pair of maximum and minimum Lewis acid Character ?

(A) BF_3, BI_3 (B) BCl_3, BF_3 (C) BI_3, BF_3 (D) BBr_3, BI_3

72. Different layers in graphite are held together by:

(A) Ionic bonding (B) Metallic bonding

(C) Covalent bonding (D) Vander waals forces

73. Which of the following is incorrect ?

(A) O_2 is weaker oxidant than O_3 (B) O_2 has small bond length than O_3

(C) Both O_2 and O_3 are paramagnetic (D) O_2 is linear and O_3 is angular in shape

74. Which of the following has pπ–dπ bonding ?
(A) NO_3^- (B) SO_3^{2-} (C) BO_3^{3-} (D) CO_3^{2-}

75. Lanthanide contraction implies -
(A) Decrease in density (B) Decrease in mass
(C) Decrease in ionic radii (D) Decrease in radioactivity

76. Which of the following complex is an outer orbital complex –
(A) $[Ni(NH_3)_6]^{2+}$ (B) $[Mn(CN)_6]^{4-}$ (C) $[Co(NH_3)_6]^{3+}$ (D) $[Fe(CN)_6]^{4-}$

77. In metal carbonyls, there is –
(A) No π bond between CO and metal atom
(B) Only σ bond between metal atom and CO molecules
(C) One σ and one π bond (back-donation) between metal atom and CO molecules
(D) The metal-carbon bonds does not exist at all

78. Which of the following will not produce a precipitate with $AgNO_3$ solution
(a) F^- (b) Br^- (c) CO_3^{2-} (d) PO_4^{3-}

79. Reagent used in the qualitative analysis of IVth group is
(a) HCl (b) H_2S (alkaline) (c) $(NH_4)_2S$ (d) None of these

80. The structure of 2- nitro-1-propanamine is -
(A) $CH_2(NO_2)–CH_2–CH_2(NH_2)$ (B) $O{=}N–O–CH(CH_3)–CH_2–NH_2$ (C) $CH_3–CH(NO_2)–CH_2(NH_2)$ (D) $CH_3–CH(O–N{=}O)–CH_2(CH_3)$

Sol. (C)

The N of nitro group will be attached from carbon chain so alternate 2nd & 4th are wrong in this way & the alternate 1st is 3-nitro-1- propane amine.

81. Which of the following are isomers -
(A) Ethanol and ethoxy ethane (B) Methanol and methoxy methane
(C) Propanoic acid and ethyl acetate (D) Propionaldehyde and acetone

82. Which process is suitable for the purification of aniline-
(A) Simple distillation (B) Steam distillation
(C) Fractional distillation (D) Fractional crystallisation

83. Arrange in decreasing pK_b -
(a) $F–CH_2CH_2COOH$ (b) $Cl–CH(Cl)–CH_2–COOH$
(c) $F–CH_2–COOH$ (d) $Br–CH_2–CH_2–COOH$
Correct answer is -
(A) (b) > (d) > (a) > (c) (B) (a) > (c) > (d) > (b)
(C) (c) > (b) > (a) > (d) (D) (d) > (b) > (a) > (c)

84. Which of the following molecules can behave both as a nucleophile and an electrophile?
(A) CH_3NH_2 (B) CH_3Cl (C) CH_3CN (D) CH_3OH

85. Baeyer's reagent is -
(A) Alkaline permanganate solution (B) Acidified permanganate solution
(C) Neutral permanganate solution (D) Aqueous bromine solution

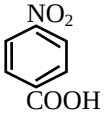
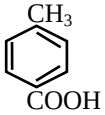
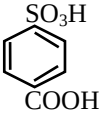
SECTION – B (Attempt any 10 questions)

86. The markownikoff's rule is used in connection with -
(A) Stereochemistry of elimination reactions (B) Stability of free radicals.
(C) Activity of enzymes (D) Addition of acids to double bonds

87. Iodoform test is not given by : -
(A) $C_6H_5COC_6H_5$ (B) CH_3COCH_3
(C) $CH_3CH_2COCH_3$ (D) $CH_3CH_2CHOHCH_3$

88. The order of reactivity of halogen acids with ether is -
(A) HCl > HBr > HI (B) HI > HBr > HCl (C) HCl > HI > HBr (D) HI > HCl > HBr

89. Acetone gives test with-
(A) 2,4 Dinitro phenyl hydrazine (B) Fehling solution
(C) Schiff's reagent (D) All

90. Which of the following acids is weaker than benzoic acid –
(A)  (B)  (C)  (D) 

91. Acetonitrile has the structure :
(A) C_2H_5NC (B) C_2H_5CN (C) CH_3NC (D) CH_3CN

92. A nonprotein organic part attached firmly by a covalent linkage to the apoenzyme is called:
(A) activator (B) cofactor (C) coenzyme (D) prosthetic group

93. Alkene $\xrightarrow{B_2H_6}$ $\xrightarrow{H_2O_2/OH^-}$ 2^o alcohol
The alkene would be -
(A) $CH_3 - CH = CH_2$ (B) $CH_3CH_2 - CH=CH_2$
(C) $(CH_3)_2C = CH_2$ (D) $CH_3 - CH = CH - CH_3$

94. The name of the compound B in the following sequence is-
$CH_3CHOHCH_3 \xrightarrow{PCl_5} A \xrightarrow[KOH]{alc} B$
(a) Propene (b) Propane (c) Propyne (d) Propanol

95. In biomolecular nucleophilic substitution, alkyl halides undergo hydrolysis through the formation of a transition state. The reactivity of the alkyl halides is in the order
(a) $1^o > 2^o > 3^o$ (b) $3^o > 2^o > 1^o$ (c) $2^o > 1^o > 3^o$ (d) $3^o = 1^o > 2^o$

96. Both ionic and free radical mechanism involve in the reaction -
(A) Chlorination of alkane (B) Williamson's synthesis
(C) Electrolysis of potassium acetate (D) Friedel-crafts reaction

97. The dipole moment of HBr is 2.6×10^{-30} cm and the interatomic spacing is 1.41 Å. The percentage of ionic character in HBr is-
(A) 10.5 (B) 11.5 (C) 12.5 (D) 13.5

98. If m = magnetic quantum number and l= azimuthal quantum number then
(a) $m = l + 2$ (b) $m = 2l^2 + 1$ (c) $l = \frac{m-1}{2}$ (d) $l = 2m + 1$

99. Identity the extensive properties in the following (I) Entropy, (II) Coulomb, (III) Specific heat, (IV) Volume

(a) I, II, III (b) II, III, IV (c) I, II, IV (d) I, III, IV

100. The element which can displace three other halogens from their compound is

(a) *Cl* (b) *F* (c) *Br* (d) *I*