Vari Medical Academy Model Question Paper:
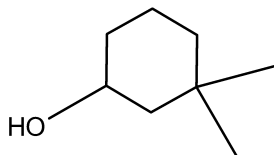
SECTION-A: 51 TO 85 WRITE ALL THE QUESTIONS
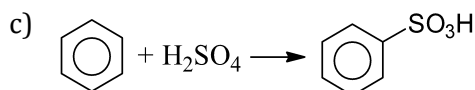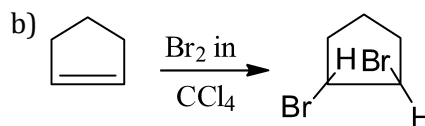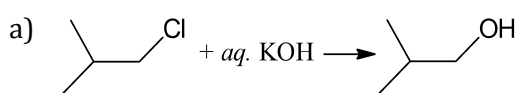
SECTION-B : 86 TO 100 WRITE ANY TEN QUESTIONS

51. The IUPAC name of the compound

a) 3, 3-dimethyl-1-hydroxy cyclohexane   b) 1, 1-dimethyl-3- hydroxy cyclohexane

c) 3, 3- dimethy-1- cyclohexanol   d) 1,1-dimethyl-3-cyclohexanol

52. The addition reaction among the following is

a) + aq. KOH $\longrightarrow$

b)

c) + H_2SO_4 $\longrightarrow$

d) All of the above

53. Racemic compound has

a) Equimolar mixture of enantiomers   b) 1:1 mixture of enantiomer and diastereomer

c) 1:1 mixture of diastereomers   d) 1:2 mixture of enantiomers

54. The following compound will undergo electrophilic substitution more readily than benzene

a) Nitrobenzene   b) Benzoic acid

c) Benzaldehyde   d) Phenol

55. Which of the following represents the given mode of hybridization $sp^2 - sp^2 - sp - sp$ from left to right?

a) $CH_2 = CH - C{\equiv}CH$ b) $HC{\equiv}C - C{\equiv}N$

c) $CH_2 = C - C = CH_2$ d)

56. Which of the following applies in the reaction $CH_3CHBrCH_2CH_3 \, Alco. KOH \rightarrow$?

$(I)CH_3CH = CHCH_3$(Major product)

$(II)CH_2 = CHCH_2CH_3$(Minor product)

a) Hofmann's rule   b) Saytzeff's rule

c) Kharasch effect   d) Markownikoff's rule

57. Carbon and hydrogen are estimated in organic compounds by

a) Kjeldalhl's method   b) Duma's method

c) Leibig's method   d) Carius method

58.   Which of the following aromatic acid is most acidic?

a)

b)

c)

d)
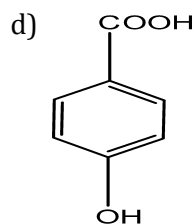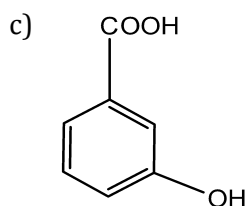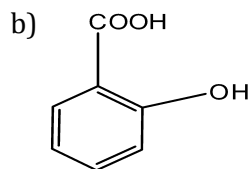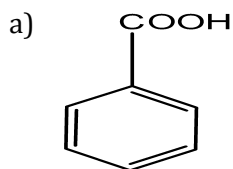
59.   The IUPAC name of
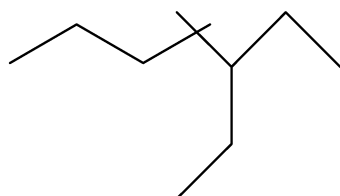
a) 1,1-diethyl1-2, 2-dimethylpentane   b) 4,4-dimethyl-5,5-diethylpentane

c) 5, 5-diethyl-4,4-dimethylpentane   d) 3-ethyl-4,4-dimethylheptane

60. $C_3H_5Cl + aq.\ NaOH \rightarrow C_2H_5OH + NaCl$;
        this reaction is
        a) Electrophilic substitution of I order   b) Electrophilic substitution of II order

        c) Nucleophilic substitution of I order   d) Nucleophilic substitution of II order

61. CH_3CH_2OH and CH_3OCH_3 are the example of

        a) Chain isomerism   b) Functional isomerism

        c) Position isomerism   d) Metamerism

62.   The alkyl halide that undergoes S_N1 reaction more radily is

        a) Ethyl bromide   b) Isopropyl bromide

        c) Vinyl bromide   d) n-propyl bromide

63.   Arrange the following carbocations in order of stability
        benzyl   allyl   methyl   vinyl
         I   II   III   IV
        a) IV>III>II>I   b) I>II>III>IV

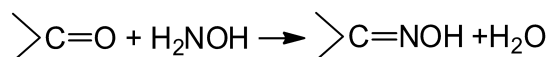c) II>IV>III>I   d) III>II>I>IV

64.   Consider the following reaction

$$\text{>C=O} + H_2NOH \longrightarrow \text{>C=NOH} + H_2O$$

Is an example of
a) Substitution   b) Elimination

c) Addition   d) Addition elimination

65.   A saturated solution prepared by dissolved $CaF_2(s)$ in water, has $[Ca^{2+}] = 3.3 \times 10^{-4}$ M. What is the K_{sp} of CaF_2?
a) 1.44×10^{-10} b) 2.24×10^{-8}

c) 1.58×10^{-8} d) 1.67×10^{-8}

66.   The solubility in water of a sparingly soluble salt A_2B is $1.0 \times 10^{-3} mol\ L^{-1}$. Its solubility product will be
a) 4×10^{-9} b) 4×10^{9}

c) 1×10^{9} d) 1×10^{-9}

67.   15 moles of H_2 and $5.2\ moles\ of\ I_2$ are mixed and allowed to attain equilibrium at 500°C. At equilibrium, the concentration of HI is found to be 10 moles. The equilibrium constant for the formation of HI is
a) 50   b) 15

c) 100   d) 25

68.   Consider the following gaseous equilibria with equilibrium constants $K_1\ and\ K_2$ respectively.

$$SO_2(g) + \frac{1}{2}O_2(g) \rightleftharpoons SO_3(g)$$
$$2SO_3(g) \rightleftharpoons 2SO_2(g) + O_2(g)$$

The equilibrium constants are related as
a) $2K_1 = K_2^2$ b) $K_1^2 = \frac{1}{K_2}$

c) $K_2^2 = \frac{1}{K_1}$ d) $K_2 = \frac{2}{K_1^2}$

69.   The pK_a of a weak acid, HA, is 4.80. The pK_b of a weak base, BOH is 4.78. The pH of an aqueous solution of the corresponding salt, BA, will be
a) 9.58   b) 4.79

c) 7.01   d) 9.22

70. For the reaction $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g);$ $\quad \Delta H =- 93.6\ kJ\ mol^{-1}$, the concentration of NH_3 at equilibrium can be increased by

(I) lowering the temperature
(II) low pressure
(III) excess of N_2
(IV) excess of H_2

a) (II) and (IV) are correct

b) (II) only is correct

c) (I), (II) and (III) are correct

d) (III) and (IV) are correct

71. According to law of mass action, for the reaction
$2A + B \rightarrow$ Products

a) Rate $= k[A][B]$

b) Rate $= k[A]^2[B]$

c) Rate $= k[A][B]^2$

d) Rate $= k[A]^{1/2}[B]$

72. Conjugate acid of $S_2O_8^{2-}$ is

a) $H_2S_2O_8$

b) H_2SO_4

c) $HS_2O_8^-$

d) HSO_4^-

73. 4 moles each of $SO_2\ and\ O_2$ gases are allowed to react to form SO_3 in a closed vessel. At equilibrium 25% of O_2 is used up. The total number of moles of all the gases at equilibrium is

a) 6.5

b) 7.0

c) 8.0

d) 2.0

74. The expression for the solubility product of $Al_2(SO_4)_3$ is

a) $K_{sp} = [Al^{3+}][SO_4^{2-}]$

b) $K_{sp} = \left[Al^{3+}\right]^2\left[SO_4^{2-}\right]^3$

c) $K_{sp} = \left[Al^{3+}\right]^3\left[SO_4^{2-}\right]^2$

d) $K_{sp} = \left[Al^{3+}\right]^2\left[SO_4^{2-}\right]^2$

75. In the reactions, $A + 2B \rightleftharpoons 2C$, if 2 moles of A, 3.0 moles of B and 2.0 moles of C are placed in a 2 L flask and the equilibrium concentration of C is 0.5 mol/L, the equilibrium constant (K_c) for the reactions is

a) 0.21

b) 0.50

c) 0.75

d) 0.025

76. 9.2g N_2O_4 is heated in a 1L vessel till equilibrium state is established
$$N_2O_4(g) \rightleftharpoons 2NO_2(g)$$

In equilibrium state 50% N_2O_4 was dissociated, Equilibrium constant will be (mol. wt. of $N_2O_4 = 92$)

a) 0.1   b) 0.4

c) 0.3   d) 0.2

77. $\Delta E°$ of combustion of isobutylene is $-x\ kJ\ mol^{-1}$. The value of $\Delta H°$ is

a) $= \Delta E°$ b) $> \Delta E°$

c) $= 0$ d) $< \Delta E°$

78. The enthalpy change for the transition of liquid water to steam is $\Delta H_{vap} = 37.3\ kJ\ mol^{-1}$ at 373 K. The entropy change for the process is

a) $132.5\ J\ mol^{-1}K^{-1}$ b) $100\ J\ mol^{-1}K^{-1}$

c) $135.3\ J\ mol^{-1}K^{-1}$ d) $75.5\ J\ mol^{-1}K^{-1}$

79. A gas can expand from 100 mL to 250 mL under a constant pressure of 2 atm. The work done by gas is

a) 30.38 J   b) 25 J

c) 5 kg J   d) 16 J

80. Based on the first law of thermodynamics, which one of the following is correct?

a) For an isochoric process$=\Delta E =- Q$ b) For an adiabatic process$=\Delta E =- W$

c) For an isothermal process$=Q =+ W$ d) For a cyclic process$=Q =- W$

81. Mark out the enthalphy of formation of carbon monoxide (CO)
Given, $C(s) + O_2(g) \rightarrow CO(g)$, $\Delta H =- 393.3$ kJ/mol

$CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g)$, $\Delta H =- 282.8\ kJ/mol$

a) 110.5 kJ/mol   b) 676.1 kJ/mol

c) 282.8 kJ/mol   d) 300.0 kJ/mol

82. An ideal gas expands in volume from $1\times10^{-3}m^3$ to $1\times10^{-2}m^3$ at 300 K against a constant pressure of $1\times10^5 Nm^{-2}$. The work done is

a) -900 J   b) -900 kJ

c) 270 kJ   d) 900 kJ

83. In a closed insulated container, a liquid is stirred with a paddle to increase its temperature. In this process, which of the following is true

a) $\Delta E = W \neq 0,\ Q = 0$ b) $\Delta E \neq 0,\ Q = W = 0$

c) $\Delta E = W = Q = 0$ d) $\Delta E = 0,\ Q \neq 0,\ W = 0$

84. In an isochoric process, the increase in internal energy is

a) Equal to the heat absorbed

b) Equal to the heat evolved

c) Equal to the work done

d) Equal to the sum of the heat adsorbed and work done

85. Which is an extensive property?

a) Temperature

b) Chemical potential

c) Gibb's free energy

d) Molar volume

86. In an irreversible process taking place at constant T and P and in which only pressure volume work is being done, the change in Gibbs free energy (dG) and change in entropy

a) $(dS)_{V,E} < 0 (dG)_{T,P} < 0$

b) $(dS)_{V,E} > 0 (dG)_{T,P} < 0$

c) $(dS)_{V,E} > 0 (dG)_{T,P} = 0$

d) $(dS)_{V,E} = 0 (dG)_{T,P} > 0$

87. Which of the following conditions will always lead to a non-spontaneous change?

a) Positive ΔH and positive ΔS

b) Negative ΔH and negative ΔS

c) Positive ΔH and negative ΔS

d) Negative ΔS and positive ΔS

88. The bond dissociation energies of gaseous H_2, Cl_2 and HCl are 104, 58 and 103 kcal respectively. The enthalpy of formation of HCl gas would be

a) $- 44$ kcal

b) 44 kcal

c) $- 22$ kcal

d) 22 kcal

89. A solid has structure in which 'W' atoms are located at the corners of a cubic lattice 'O' atoms at the centre of edge and Na atoms at the centre of cube. The formula for the compound is

a) Na_2WO_3

b) Na_2WO_2

c) $NaWO_2$

d) $NaWO_3$

90. Graphite is a

a) Molecular solid

b) Covalent solid

c) Ionic solid

d) Metallic solid

91. In $CsCl$ type structure the coordination number of Cs^+ and Cl^- are

a) 6, 6

b) 6, 8

c) 8, 8

d) 8, 6

92. The edge length of a face centred cubic cell of an ionic substance is 508 pm. If the radius of the cation is 110 pm, the radius of the anions is

a) 288 pm   b) 398 pm

c) 618 pm   d) 144 pm

93. A compound of 'A' and 'B' crystallises in a cubic lattice in which 'A' atoms occupy the lattice points at the corners of the cube. The 'B' atoms occupy the centre of each face of the cube. The probable empirical formula of the compound is

a) AB_2 b) A_3B

c) AB d) AB_3

94. In a solid lattice, the cation has left a lattice site and is located at an interstitial position, the lattice defect is

a) Frenkel defect   b) Schottky defect

c) F-centre defect   d) Valency defect

95. The axial angles in triclinic crystal system are

a) $\alpha = \beta = \gamma = 90°$ b) $\alpha = \gamma = 90°, \beta \neq 90°$

c) $\alpha \neq \beta \neq \gamma \neq 90°$ d) $\alpha = \beta = \gamma \neq 90°$

96. The radii of Na^+ and Cl^- ions are 95 pm and 181 pm respectively. The edge length of $NaCl$ unit cell is

a) 276 pm   b) 138 pm

c) 552 pm   d) 415 pm

97. The cubic unit cell of Al $\left(molar\ mass\ 27\ g\ mol^{-1}\right)$ has an edge length of 405 pm. Its density is 2.7 g cm^{-3}. The cubic unit cell is

a) Face centred   b) Body centred

c) Primitive   d) Edge centred

98. If the radius of K^+ and F^- are 133 pm and 136 pm respectively, the distance between K^+ and F^- in KF is

a) 269 pm   b) 134.5 pm

c) 136 pm   d) 3 pm

99. Percentage of free space in cubic close packed structure and in body centred packed structure are respectively

a) 30% and 26%   b) 26% and 32%

c) 32% and 48%   d) 48% and 26%

100. A solid is made of two elements X and Z. The atoms Z are in ccp arrangement while the atom X occupy all the tetrahedral sites. What is the formula of the compound?

a) XZ

b) XZ_2

c) X_2Z

d) X_2Z_3

ANSWER KEY:

51	C	61	B	71	B	81	A	91	C
52	B	62	C	72	C	82	A	92	D
53	A	63	B	73	A	83	A	93	D
54	D	64	D	74	B	84	A	94	A
55	A	65	A	75	A	85	C	95	C
56	B	66	A	76	D	86	B	96	C
57	C	67	A	77	D	87	C	97	A
58	B	68	B	78	B	88	C	98	A
59	D	69	C	79	A	89	D	99	B
60	D	70	C	80	D	90	B	100	C