KANTIPUR ENGINEERING COLLEGE
Dhapakhel, Lalitpur
Model Entrance Test (2074)

Solution Set: I (B)

Section I

1. (D)	2. (B)	3. (C)	4. (A)	5. (A)
6. (B)	7. (C)	8. (D)	9. (B)	10. (D)
11. (A)	12. (C)	13. (C)	14. (A)	15. (B)
16. (D)	17. (A)	18. (A)		

19. (C) **Hint:** $1+\frac{x^2}{2!}+\frac{x^4}{4!}+.....=\cos hx$

20 (C)

Solution: $\int e^{-\log x}\, dn = \int e^{\log x^{-1}}\, dx = \int x^{-1}\, dn = \log|x|$

21. (D) 22. (D)

23. (B)

Hint: $x_2 - x_1 = 12$, $y_2 - y_1 = 4$, $z_2 - z_1 = 3$

$$l=\frac{x_2-x_4}{\gamma},\ m=\frac{y_2-y_1}{\gamma},\ n=\frac{z_2-z_1}{\gamma},\ \gamma=\sqrt{(x_2-x_4)^2+(y_2-y_1)^2+(z_2-z_1)^2}$$

24. (B)	25.(D)	26. (B)	27. (C)	28. (A)
29. (D)	30 (D)	31. (D)	32. (A)	33. (A)
34. (A)	35 (C)	36. (C)	37. (C)	38. (B)
39. (B)	40. (B)	41. (B)	42,(A)	43. (C)
44. (D)	45. (D)	46. (A)	47. (C)	48. (B)
49. (B)				

50. (D)

Solution: No. of mol. of hydrogen = Wt. in gm / molar wt. = 5/2 = 2.5

1 mol $= 6.023 \times 10^{23}$

2.5 mol $= 2.5 \times 6.023 \times 10^{23}$ molecules $= 1.505 \times 10^{24}$ molecules

51. (C)

Solution: If $[H^+]$ is less than 10^{-6}, consider the ions of H_2O

$[H^+] = 10^{-8} + 10^{-7} = 1.1\times10^{-7}$ M

pH $= -\log [H^+] = -\log 1.1\times10^{-7} = 6.95$

52. (A)	53. (D)	54. (B)	55. (A)	56. (C)
57. (C)	58. (B)	59. (D)	60. (A)	

Section II

61. (B)	62. (D)	63. (C)	64. (A)	65. (B)
66. (D)	67. (A)	68. (C)		

69. (A)

Solution: Centroid (a, b, c) $=\left(\frac{x_1}{3}, \frac{y_1}{3}, \frac{z_1}{3}\right)$

A (x_1 , 0, 0), B(0, y_1, 0), C(0, 0, z_1)

Eq^n. g plane $\frac{x}{x_1} + \frac{y}{y_1} + \frac{z}{z_1} = 1$

$\Rightarrow \frac{x}{3a} + \frac{y}{3b} + \frac{z}{3c} = 1$

$\Rightarrow \frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 3$

70. (A)

Solution: $x = \frac{1}{1-a}, \ y = \frac{1}{1-b}, z = \frac{1}{1-c}$

A, b, c are in A.P

1 – a, 1- b, 1- c are in A.P.

$\frac{1}{1-a}, \frac{1}{1-b}, \frac{1}{1-c}$ are in H.P.

71. (C) **Hint:** |z| = 1 $\Rightarrow$ $z\bar{z} = 1$

72. (B)	73. (C)	74. (B)	75. (D)

76. (D)

Hint:

$V = \frac{4}{3}\pi r^3, \ \frac{dv}{dt} = 4\pi r^2 \ \frac{dr}{dt}$

77. (D)

Hint:

$\int_{-1}^{1} |1-x|dx = \int_{-1}^{0} |1-x|dx + \int_{0}^{1} |1-x|\,dx$

$= \int_{-1}^{0} (1-x)\,dx + \int_{0}^{1} (1-x)\,dx$

78. (A)	79. (C)	80. (B)	81. (B)

82. (D)

Solution:

$\cos\theta = \frac{\vec{A}.\vec{b}}{|A||B|} = 0 \Rightarrow \theta = 90^0$

83. (C)

Solution:

Assuming upward direction as the and downward direction as –ve

4 = 100 mls, u = -100 mls, g = 10 mls^2

S_6 – 100 = 100 – 10 t.

$\Rightarrow 10\ t = 200$

$\therefore t = 20 \sec$

84. (A)

Solution:

$$\frac{(K.E) escape}{(K.E) orbital} = \frac{\frac{1}{2} m u_e^2}{\frac{1}{2} m u_0^2} = \left(\frac{u_e}{u_0}\right)^2 = \left(\frac{\sqrt{2}\ u_0}{u_0}\right)^2 = 2$$

$\therefore Ee = 2 E_0$

85. (A)

Solution:

2 d_1 = v f_1 $\Rightarrow$ d_1 = 525 m

Similarly, d_2 = 875 m

$\therefore$ Distance bet^n two cliffs d= d_1 + d_2= 1400 m

86. (D)

Solution:

$$\frac{c}{100} = \frac{\theta - LFP}{UFP - LFP} \quad \Rightarrow \frac{50}{100} = \frac{60 - (-10)}{UFP - (-10)}$$

$\therefore UFP = 130^0 C$

87. (B)

Solution:

When two gases are mixed, the internal energy of the system is U = U_1 + U_2

(n_1 + n_2) Cv T = n_1 Cv T_1 + n_2 CV_e T_2 ($\therefore$ both are diatomic gas, ev is same for both)

$$T = \frac{n_1\ T_1 + n_2\ T_2}{n_1\ n_2}$$

T_1 = 273 + 27 = 300k, T_2 = 273 + 37 = 310 k

$$n_1 = \frac{22}{12 + 3L}\ 0.5 \quad , n_2 = \frac{16}{32} = 0.5$$

$$\therefore T = \frac{300 \times 0.5 + 0.5 \times 310}{1} = 150 + 155 = 305$$

$$\therefore T = 305 - 273 = 32^v c$$

88. (C)

89. (D)

Solution:

Potential areas $1\mu F, V_1 = \frac{c_2}{c_1 + c_2} \times V = 4V$

Potential areas $2\mu F$, $\frac{c_1}{c_1 + c_2} \times V = 2V$

$\therefore U_1 = \frac{1}{2} c_1 \; v_1^{\;2} = 8$

$U_2 = \frac{1}{2} c_2 \; v_2^1 = 4$

$\therefore \frac{U_1}{U_2} = 2{:}1$

90. (D)

Solution:

Rt = R_o (1 + $\alpha \Delta\theta$) $\Rightarrow$

2 = 1 (1 + 0.00125 $\Delta\theta$)

1 = 0.00125 $\Delta\theta$

$\Delta\theta$ = 1/0.00125 = 100000/125 = 800 $\therefore$ T_2 = 1100k

91. (C) **Solution:** $Radius \;\; r = \frac{m6}{B9} = \frac{\sqrt{2mk}}{B9}$

On doubling the K.E. of the particle, the radius because $\sqrt{2}$ time

92. (B) **Solution:** $E = -\frac{l\,dt}{dt} = -5 \times -2 \quad = 10V$

93. (B)

Solution:

$\delta_A = (a\mu g - 1)\,A = \left(\frac{3}{2} - 1\right) A = A/2$

$\delta w = (w\mu g \;\; -1)\;\; A = \left(\frac{\mu g}{\mu w} - 1\right) A$

$= \left(\frac{3/2}{4/3} - 1\right) A = A/8$

$\therefore \frac{\delta_w}{\delta_A} = \frac{1}{4}$

94. (A)

95. (C)

Solution:

The change in stopping potential

$$= \frac{4c}{e}\left(\frac{1}{\lambda 2} - \frac{1}{\lambda 1}\right) = \frac{6.6 \times 10^{-34} \times 3 \times 10^{8}}{1.6 \times 10^{-19}}\left(\frac{10^{10}}{3000} - \frac{10^{10}}{4000}\right)$$

= 1.03 V

96. (A)

Solution:

$$As \quad V = \frac{hc}{\lambda e} - \phi_0$$

$$= \frac{4.14 \times 10^{-15} \times 3 \times 10^{8}}{2000 \times 10^{-10} \times 1} - 5.01 ev$$

= 1.2 ev

97. (D)

Solution: The definition of pH is

pH = - log[H^+]

[H^+] = 3.3 × 10 $^{-2}$

pH = - log (3.3 × 10 $^{-2}$) = - (- 1.48)

= 1.48

98. (B)

Solution: ECE = 0.0003294

1 C electricity deposit 0.0003294 gm

In order to deposit 5 gm of Cu 5 / 0.0003294 = 15179 C

99. (C) 100. (A)

****