

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

Solution Set: II (A)

Section I

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

Solution

9.8 g of $H_2SO_4 = 4.8$ g of metal

49 g (gram eq.wt. of H_2SO_4) = $4.8 / 9.8 \times 49 = 24$ g (gram equivalent wt.) of the metal

Equivalent weight of the metal =24

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|---------|---------|---------|----------|
| 19. (D) | 20. (D) | 21. (A) | 22. (C) |
| 24. (B) | 25. (D) | 26. (C) | 27. (A) |
| 29. (B) | 30. (A) | 31. (C) | 32. (C) |
| 34. (D) | 35. (A) | 36. (B) | 37. (D) |
| 39. (A) | 40. (B) | | 38. (C) |
| 41. (D) | | | |

Hint: A (a, 0, 0), B(0, b, 0), C(0, 0, c)

$$\alpha = \frac{a}{3}, \beta = \frac{b}{3}, \gamma = \frac{c}{3}$$

$$\Rightarrow a = 3\alpha, b = 3\beta, c = 3\gamma$$

42. (A)

Hint: $|\text{adj. } A| = |A|^{n-1}$

43. (C)

Hint: $x = \sqrt{2+x}$,
 $\Rightarrow x^2 = 2+x$

44. (A)

45. (A) Hint: $\log_a m^{x^n} = \frac{n}{m} \log_a x$

$$y = \log_{x^{1/2}} x = \frac{1}{\frac{1}{z}} \log_x x = 2$$

46. (C)

47. (B)

48. (C)

49. (B)

50. (D)

51. (D)

52. (B)

53. (C)

54. (A)

55. (A)

56. (B)

57. (C)

58. (D)

59. (B)

60. (D)

Section II

61. (A)

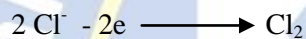
62. (C)

63. (C)

64. (A)

65. (B)

Solution:



$$2F = 22.4 \text{ litres at NTP}$$

$$\text{For } 2.24 \text{ lit } Q = 2 / 22.4 \times 2.24 = 0.2F = 0.2 \times 96500 \text{ C}$$

$$I = Q / t = 0.2 \times 96500 / 60 \times 60 = 5.36 \text{ amp}$$

66. (D) **Solution:** $V_1 = 0.6 \text{ litres} = 1000 \times 0.6 \text{ ml} = 600 \text{ ml}$; $S_1 = 0.205 \text{ N}$

$$S_2 = 0.1 \text{N}, V_2 = ?$$

$$\text{We know } V_1 S_1 = V_2 S_2$$

$$V_2 = V_1 S_1 / S_2 = 600 \times 0.205 / 0.1 = 1230 \text{ ml}$$

$$\text{The amount of water} = (1230 - 600) \text{ ml} = 630 \text{ ml}$$

67. (A)

68. (A)

69. (C)

Solution:

$$R = \sqrt{Rx^2 + Ry^2} \Rightarrow R^2 = Rx^2 + Ry^2$$

$$R_x = \sqrt{R^2 - Ry^2} = \sqrt{(20)^2 - (12)^2} = 16 \text{ N}$$

70. (C) **Solution:** Since $Kl = \text{content}$

$$K^{1/2} = kl$$

$$\therefore k^1 = 2k$$

71. (D)

Solution:

$$T = (L_f - L_i)/t = (4 L_0 - L_0)/4 = 3/4 L_0$$

72. (D)

Solution:

$$f = f \frac{v - g_0}{v - g_s} = 140 H_2$$

73. (B)

Solution:

$$\frac{\text{Scale reading} - LFP}{UFP - LFP} \cos ns \tan t$$
$$\Rightarrow \frac{c - 0}{100 - 0} = \frac{59 - 5}{95 - 5} \Rightarrow c = 60^\circ c$$

74. (B)

Solution:

$$p = \frac{mlf}{t} = \frac{60 \times 80 \times 4.2}{60} = 336 \text{ sec}$$

75. (D)

Solution:

$$E_x = \frac{dv}{dy} \Big|_{x=0, y=0, z=0} = 6V/m$$

$$E_y = \frac{dv}{dy} \Big|_{x=0, y=0, z=0} = -8V/m$$

$$E_z = \frac{dv}{dz} \Big|_{x=0, y=0, z=0}$$

$$E = \sqrt{E_x^2 + E_y^2 + E_z^2} = 10V/m$$

$$\therefore F = qE = 2 \times 10 = 20N$$

76. (D)

Solution:

$$U = \frac{1}{2} q v = \frac{1}{2} \times 200 \times 0.1 = 10 j$$

77. (B)

Solution:

Let R be the resistance of each wire

In series, heat produced is $Q_1 = \mathcal{E}^2 / 2R$

In parallel, heat produced is $Q_2 = \mathcal{E}^2 / R/2$

$$\therefore \frac{Q_1}{Q_2} = \frac{1}{4} = 1:4$$

78. (C)

Hint: $\sin \beta \propto \frac{1}{r}$

79. (A) Hint:

$$w = \frac{1}{\sqrt{LC}} 50 \text{ rad/s}$$

80. (A) Hint:

$$\mu = \sin\left(\frac{A + Dm}{2}\right) / \sin A/2$$

81. (B) Hint: $\beta^1 = \frac{\lambda D}{d^1 \mu} = \frac{\lambda D}{\frac{d}{2} \cdot \mu} = \frac{2\beta}{4/3} = \frac{3}{2} \beta$

82. (C)

Solution:

In This reaction, the energy released will be in the form of heat energy

$$\begin{aligned} \text{Energy released} &= \text{Binding energy of } 2 \text{ H}_e^4 \text{ minus twice the binding energy of } 1 \text{ H}_2 \\ &= 28 = 2 \times 2.2 = 23.6 \text{ Mev} \end{aligned}$$

83. (D)

Solution:

Here $\frac{N}{N_0} = \frac{1}{4}$

$$\frac{1}{4} = \left(\frac{1}{2}\right)^{t/T} \Rightarrow \frac{t}{T} = 2$$

$$\therefore t = 2T = 2 \times 4 = 8 \text{ months.}$$

84. (B)

Hint: $\vec{a} + \vec{b} = -\vec{c}$

$$\Rightarrow (\vec{a} + \vec{b})^2 = (\vec{c})^2$$

$$\Rightarrow |\vec{a}|^2 + |\vec{b}|^2 + 2\vec{a} \cdot \vec{b} = |\vec{c}|^2$$

85. (D) Hint: Domain : $4x - x^2 \geq 0$

$$\text{Range : Min.} = 0, \quad \text{Max.} = 2$$

86. (A) Solution: $\frac{r_1}{r^2} = \frac{\Delta/s-a}{\Delta/s-a} = \frac{s-b}{s-a}$

$$\frac{r_1}{r_3} = \frac{s-c}{s-a}$$

$$\left(1 - \frac{r_1}{r_2}\right) \left(1 - \frac{r_1}{r_3}\right) = 2 \text{ gives } a^2 = b^2 + c^2$$

87. (C)

88. (C)

89. (A)

90. (B)

91. (D) Hint: $6! - 5! = 600$

92. (A) Hint: $\log(1+x+x^2) = \log \frac{\{(1-n)(1+x+x^2)\}}{1-x} = \log(1-x^3) - \log(1-x)$

93. (A)

94. (C)

Solution:

$\frac{1}{30}, \frac{1}{24}, \frac{1}{20}$ are in A.P.

$$d = \frac{1}{120}$$

$$\text{next term} = \frac{1}{20} + \frac{1}{120} = \frac{7}{120}$$

$$\text{next term of H.P.} = \frac{120}{7}$$

95. (C)

96. (D)

97. (D)

98. (B)

Solution: $x^1(x) = f^1(x) - f^1(-x) = 0$

$$f^1(x) = f^1(-x)$$

99. (B)

100. (D)
