Answers E&T-1 Full Mock Test-2 dated 29.05.2015

1. (C) Mean free path is infinite for ideal case which means there are no collisions and electrical conductivity is infinite At low temperature Mean free pathαT^3 and at high temperature Mean free pathαT
2. (D) All are correct statements
3. (B) $B = \mu_0 (M + H)$

   $B = 0 \Rightarrow \frac{M}{H} = -1$
4. (C) It becomes stable by gaining or losing electrons
5. (A)
6. (A) Al is used for electromigration because it is good conductor of electricity
7. (A) Not a low temperature but at Curie temperature they are converted into Paramagnetic
8. (A)
9. (A) In case of solids $E_i = E + \frac{P}{3\varepsilon_0}$ so here value of E is increased
10. (C)
11. (D)
12. (D)
13. (B)
14. (B)
15. (A)
16. (A) It is not necessary that all good conductors are also superconductors
17. (A) Diamagnetic materials are lightly repelled by magnetic fields.
18. (C) In poly atomic gas all three type of polarization will occur while in case of mono atomic only electronic polarization will occur
19. (C) $S = \frac{(\beta+1)(R_B + R_e)}{R_B + (\beta+1)R_e}$
20. (C) $V_H = \frac{B.I}{n.e.w}$
21. (D)
22. (D) Intrinsic as well extrinsic both are neutral in nature
23. (A)
24. (D) Output of UJT is saw tooth wave
25. (A) SCR has 3 terminals and can be manufactured by Si only and not from Ge.
26. (A)
27. (A) Photo diode detects light while LED emits light
28. (B) $I_m = \frac{12-4}{1} = 8mA$
29. (B) For Photo voltaic mode/Solar cell it must operate in 4^{th} quadrant

30. (C) Capacitor will charge upto peak value V_m and in case of load it behaves like HWR

31. (D)

32. (B) It is standard question and is based upon continuity equation

33. (C) Reverse resistance does not increase with increase in temperature

34. (B) LED emits light

35. (C) $E = \frac{hc}{\lambda} = \frac{12375}{\lambda(A^0)}$

36. (D) GaAsP emits light in visible region

37. (D) $T_1 = 8 \& T_2 = 8\pi \Rightarrow \frac{T_1}{T_2} = \frac{1}{\pi} \rightarrow$ Not Rational number so not periodic

38. (D) Non invertible means for distinct output is not distinct For both positive and negative values

$S_1 : y(t) = x^2(t) \rightarrow Non\,invertible$

$S_2 : y(t) = \frac{dx}{dt} \rightarrow Non\,invertible$

For constant differentiation is zero

39. (B) $y(t) = |x(t)|$ is non linear system & $y(t) = \int_{-\infty}^{2t} x(t)dt$ is time variant system

40. (A)

41. (C) $\omega = 2$

$$H(s) = \frac{s-2}{s^2+4s+4} \Rightarrow H(j2) = \frac{j2-2}{-4+4j2+4} = \frac{j-1}{4j}$$

$$|H(j2)| = \frac{\sqrt{2}}{4} = \frac{1}{2\sqrt{2}} \& \phi = +45^0$$

42. (A) PSD and ACF are F.T pairs to each other

43. (B) ACF is $e^{-2|t|}$ so PSD is $\frac{2\times 2}{4+\omega^2}$

Maximum value of PSD is at w=0 and this is equal to 1

44. (C) $$\int_{-\infty}^{\infty} |x(t)|^2 dt = \frac{1}{2\pi}\int_{-\infty}^{\infty} |x(jw)|^2 dw = \frac{1}{2\pi}\int_{-1}^{1} 1^2 dw = \frac{1}{2\pi}\int_{-1}^{1} 1 dw = \frac{1}{\pi}$$

45. (D) It cannot be defined

46. (C)

47. (D) For Non Minimum phase zero must not be in right hand side

48. (B) Final value is

$$\lim_{z\to 1}(1-z^{-1})X(z) = \lim_{z\to 1}(1-z^{-1})\frac{z^{-1}\left(1-z^{-4}\right)}{4\left(1-z^{-1}\right)^2}$$

$$= \lim_{z\to 1}(1-z^{-1})\frac{z^{-1}\left(1-z^{-4}\right)}{4\left(1-z^{-1}\right)^2} = \lim_{z\to 1}\frac{z^{-1}\left(1+z^{-2}\right)(1+z^{-1})}{4} = 1$$

49. (B)

50. (C)
51. (B) Linearity and causality is not necessary but non linearity will be there.
52. (A) It is periodic Laplace transform so can be solved by that method
53. (A) It has Half wave symmetry
54. (D)
55. (D) It is used for small voltage range
56. (C) It measures voltage difference between both signals
57. (A)
58. (B)
59. (B)
60. (D)
61. (A)
62. (B)
63. (D)
64. (B)
65. (A)
66. (B) Induction type has the lowest accuracy
67. (A) $C_d = \dfrac{C_1 - 4C_2}{3}$
68. (B) $\text{Linearity} = \dfrac{\pm 0.003\%}{1.5} \times 100\% = \pm 0.2\%$
69. (B)
70. (C) $\tan\phi = \sqrt{3}\left(\dfrac{P_1 - P_2}{P_1 + P_2}\right)$
71. (C)
72. (D)
73. (D) At t=0 current will be 10 A which is possible either in option (A) or (D) but here L&C are in parallel so it would be sinusoidal nature so option (D) will be correct
74. (C) $v(t) = \delta(t) = 1 \times \dfrac{di}{dt} \Rightarrow 1 = s \times I(s)$

$\Rightarrow i(t) = u(t)$

$E(t) = \int_{-\infty}^{\infty} \delta(t).u(t)dt = 1J$

75. (D) Values of R,L&C are not given
76. (C)
77. (B)
78. (A) Just Use Thevenin's equivalent circuit
79. (A)
80. (C)

81. (A) $10 = 10\,i(t) + 1\frac{di}{dt} + \frac{1}{10\times10^{-6}}\int_0^t i(t)\,dt$

$at\ \ t = 0^+\ \ i(0+) = 0$

$10 = 10\times0 + 1\frac{di}{dt} + 0 \Rightarrow \frac{di}{dt} = 1A/s$

$0 = 10\frac{di(t)}{dt} + 1\frac{d^2i}{dt^2} + \frac{1}{10\times10^{-6}}i(t)$

$0 = 10\times10 + 1\frac{d^2i}{dt^2} + 0$

$\frac{d^2i}{dt^2} = -100A/\sec^2$

82. (A) $L_{eq} = \frac{L_1L_2 - M^2}{L_1 + L_2 + 2M} = \frac{-25+9}{16j}$

$L_{eq} = (+j)$

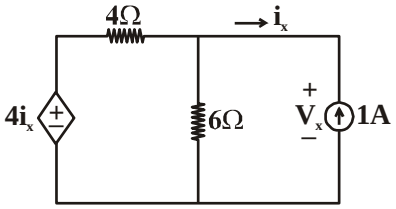
$Z_{in} = j\omega L_{eq} = j\times50\times j = -50\Omega$

83. (B)

84. (C) $P = \left(\frac{2^2}{2} + \frac{3^2}{2}\right)\times4 = 26W$

85. (C) $Q = \frac{1}{2\xi} = \frac{1}{2\times0.1} = 5$

86. (D)



$\rightarrow \quad \frac{V_x}{6} + \frac{V_x - 4(-1)}{6} - 1 = 0 \qquad \Rightarrow \boxed{V_x = 1V}$

$\rightarrow \quad \boxed{R_{Th} = 1\Omega}$

87. (D)

88. (A) $L_1 = 5 \qquad L_2 = 7$

$M = -4$

$L_{eq} = L_1 + L_2 - 2M = 5 + 7 + 8 = 20H$

89. (D) $3 = \frac{V_{oc}}{R_{Th}} \quad \&1.5 = \frac{V_{oc}}{2 + R_{Th}}$

$\therefore\ 2 = \frac{R_{Th} + 2}{R_{Th}}$

$\Rightarrow \boxed{R_{Th} = 2\Omega}\ \& \quad \boxed{V_{oc} = 6V}$

$$I = \frac{6}{2+1} = 2A$$

90. (A) $Y = j\omega C + \frac{1}{1+j1} = j\omega C + \frac{1-j1}{1+1}$

$\Rightarrow \omega C = \frac{1}{2}$ but $\omega = 2 \Rightarrow C = \frac{1}{4}$

91. (C)

92. (A)

93. (A)

94. (C) $E = \frac{-d\phi}{dt}$

95. (A)

96. (C)

97. (C) $D = \frac{4\pi \times (57.3)^2}{2^o \times 2^o}$

98. (B) $K = \frac{1}{3} = \frac{1-\frac{1}{2}}{1+\frac{1}{2}}$

$VSWR = \frac{1+\frac{1}{3}}{1-\frac{1}{3}} = 2$

99. (B) It is an example of end-fire array.

100. (D) when line is terminated by characteristic impedance it behaves like an infinite line

101. (A) $\lambda_c = 2a$

102. (D) Current must vary in time and space both

103. (B) Electrical length βl

104. (B) Reflection constant is vector quantity

105. (C)

106. (D) $R_r = 80\pi^2 \left(\frac{dl}{\lambda}\right)^2 \Rightarrow R_r \propto f^2$ *not square root*

107. (C)

108. (B)

109. (B)

110. (A)

111. (D)

112. (A)

113. (A)

114. (A)

115. (D)

116. (A)

117. (B)

118. (A)

119. (A)

120. (B)