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Answer-key & Solution

SSC JE (Electrical)
Practice Set-15

1. C	26. C	51. D	76. D	101. B	126. A	151. C	176. A
2. B	27. B	52. A	77. C	102. B	127. A	152. D	177. A
3. B	28. B	53. B	78. B	103. A	128. C	153. D	178. D
4. D	29. A	54. B	79. B	104. A	129. A	154. C	179. B
5. C	30. D	55. A	80. A	105. C	130. B	155. B	180. A
6. D	31. B	56. A	81. C	106. A	131. B	156. A	181. C
7. D	32. A	57. A	82. B	107. A	132. A	157. D	182. A
8. D	33. A	58. D	83. C	108. A	133. C	158. D	183. B
9. B	34. B	59. C	84. B	109. D	134. A	159. B	184. B
10. B	35. C	60. A	85. A	110. B	135. C	160. A	185. C
11. A	36. B	61. D	86. B	111. B	136. B	161. B	186. D
12. D	37. B	62. B	87. C	112. B	137. C	162. C	187. D
13. A	38. B	63. B	88. C	113. A	138. B	163. A	188. D
14. C	39. C	64. B	89. D	114. A	139. B	164. C	189. D
15. C	40. A	65. C	90. C	115. D	140. B	165. D	190. A
16. A	41. A	66. B	91. C	116. C	141. D	166. A	191. B
17. A	42. D	67. A	92. B	117. B	142. A	167. C	192. D
18. B	43. C	68. D	93. D	118. B	143. D	168. C	193. D
19. D	44. A	69. B	94. B	119. B	144. C	169. C	194. A
20. C	45. D	70. B	95. D	120. A	145. B	170. C	195. C
21. B	46. B	71. C	96. B	121. B	146. D	171. A	196. D
22. B	47. C	72. B	97. B	122. A	147. B	172. C	197. B
23. C	48. B	73. B	98. C	123. A	148. B	173. B	198. C
24. D	49. B	74. B	99. D	124. A	149. D	174. B	199. A
25. B	50. A	75. D	100. C	125. A	150. C	175. C	200. A

Note : *If your opinion differ regarding any answer, please message the mock test and Question number to 8375805483*

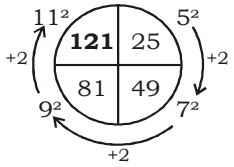
Note : *If you face any problem regarding result or marks scored, please contact : 9313111777*

SOLUTION SSC JE (Electrical) Practice Set-15

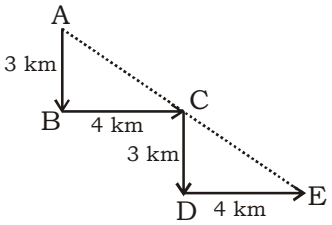
1. (C) 24 : 288 :: 22 : **242**
   $24^2 \div 2$; $22^2 \div 2$
2. (B)
3. (B) 5 : 26 :: 8 : **65**
   $5^2 + 1$; $8^2 + 1$
4. (D) $\frac{3}{8} : \frac{12}{32} :: \frac{4}{5} : \frac{\mathbf{16}}{\mathbf{20}}$ (×4 on each)
5. (C) N×O : 14×15 :: G×S : **7×19** (Place value)
6. (D)
7. (D) BMCX : CNDY :: **DWEV** : EXFW (+1 each)
8. (D) Pyorrhea is related to tooth. Similarly, eczema is related to skin.
9. (B) Democracy is always associated with justice.
10. (B) Except peepal, all of them are plant, but peepal is a tree.
11. (A) Except excite, all of them represent development (Growth)
12. (D) (A) Z X W U (-2, -1, -2) (B) Y W V T (-2, -1, -2)
    (C) W U T R (-2, -1, -2) (D) **Z X U R** (-2, -2, -4)
13. (A) Except (A), All others are the rivers of Northern India.
14. (C) [23-64] is a co-prime pair.
15. (C) Except option (C) all digits are divisible by 3.
16. (A) Except (A), All of them belong to one category.
17. (A) $3 - 8 \Rightarrow 3 + 8 = 11$ (prime no.)
    $6 - 8 \Rightarrow 6 + 8 = 14$
    $4 - 5 \Rightarrow 4 + 5 = 9$
    $5 - 7 \Rightarrow 5 + 7 = 12$
18. (B) Brass is an alloy.
19. (D) pair
20. (C) $\frac{\text{Cell}}{2}$ $\frac{\text{Tissue}}{1}$ $\frac{\text{Organ}}{3}$
21. (B) Z3A W9D **T27G** Q81J N243M (×3 / +3)
22. (B) D F **G I** J L M O (+3)
23. (C) 7 12 19 28 39 **52** (+5, +7, +9, +11, +13)
24. (D) (D,E) (I,J) (O,P)
    BC , FGH , KLMN , **QRSTU** , XYZABC
25. (B) DMP **FLN** HKL JJJ LIH (+2, -1, -2)
26. (C) $1 \times 1 + 1^2 = 2$
    $2 \times 2 + 2^2 = 8$
    $8 \times 3 + 3^2 = \mathbf{33}$
    $33 \times 4 + 4^2 = 148$
    $148 \times 5 + 5^2 = 765$
27. (B) $9 \times 3 - 4 + 6 = 29$
    $27 - 4 + 6 = 29$
    $27 + 6 - 4 = 29$
    $33 - 4 = 29$
    $29 = 29$
28. (B) $7 - 3 \times 6 = 24$ (According to given option)
    $4 \times 6 = 24$
    $24 = 24$
29. (A) SYDNEY
30. (D) E V E N T ⟶ 5 4 5 5 2
    5 22 5 14 20 ; 5+0, 2+2, 5+0, 1+4, 2+0
    Similarly,
    R E V E N G E ⟶ **9 5 4 5 5 7 5**
    18 5 22 5 14 7 5 ; 1+8, 5+0, 2+2, 5+0, 1+4, 7+0, 5+0
31. (B) $\frac{\text{Area of smaller circle}}{\text{Area of larger circle}} = \frac{\pi(a)^2}{\pi(2a)^2} = \frac{1}{4}$
32. (A) $7x - 5y = 20$ .....(i)
    $12x + 5y = 75$ .....(ii)
    Adding equation (i) & (ii)
    $19x = 95$
    $x = 5$
    Putting the value of $x = 5$ in equ. (i)
    $7 \times 5 - 5 = 20$
    $5y = 15$
    $y = 3$
    Now, $xy = 5 \times 3 = 15$
33. (A)
34. (B) B A C T E R I A ⟶ A B I A R C E T
    1 2 3 4 5 6 7 8 ; 8 1 7 2 6 3 5 4
    Similarly,
    P R O T O Z O A ⟶ **A P O R Z O O T**
    1 2 3 4 5 6 7 8 ; 8 1 7 2 6 3 5 4
35. (C) $3 \times 5 \times 2 \div 3 = 10$
    $4 \times 7 \times 3 \div 4 = 21$
    Similarly,
    $5 \times 9 \times 4 \div 5 = 36$

36. (B) $51 \Rightarrow 7^2 + 2$
$66 \Rightarrow 8^2 + 2$
$83 \Rightarrow 9^2 + 2$
$102 \Rightarrow 10^2 + 2$
$123 \Rightarrow 11^2 + 2$
$146 \Rightarrow 12^2 + 2$

37. (B)



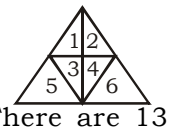
38. (B)



$AE = \sqrt{AB^2 + BC^2} + \sqrt{CD^2 + DE^2}$
$= \sqrt{3^2 + 4^2} + \sqrt{3^2 + 4^2}$
$= \sqrt{9+16} + \sqrt{9+16}$
$= \sqrt{25} + \sqrt{25}$
$= 5 + 5 = 10$ cm

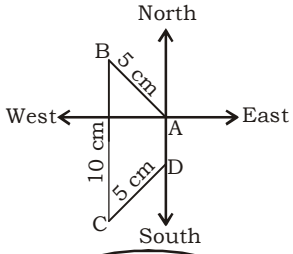
39. (C) 40. (A)

41. (A)

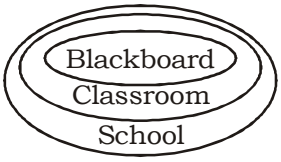


There are 13 triangles are in the given figure:- 1, 2, 3, 4, 5, 6, (1, 2), (3, 4), (1, 3), (2, 4), (1, 2, 3, 4, 5, 6), (1, 3, 5) and (2, 4, 6)

42. (D)

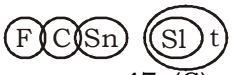


43. (C)



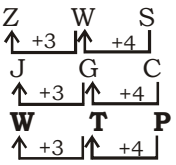
44. (A)

45. (D)



46. (B) 47. (C) 48. (B)

49. (B)



50. (A)

101. (B) $V_2 = V_1 \frac{N_2}{N_1}$

$= 230 \times \frac{1}{10} = 23$ V

PIV = $\sqrt{2} \times 23$
$= 32.52$ Volts.

103. (A) DC machine has direct contact to conductor and controlling of current through directly. Hence it is called as conduction machine.

106. (A) Wave winding is a series winding in which the armature conductors are divided into two parallel paths between the positive and negative brushes irrespective of the number of poles of the machine. So wave winding used for low current and high voltage rating DC machine.

107. (A) Lap winding is a parallel winding on which armature conductors are divided into as many parallel paths as the number of poles of the machine and the adjacent ends of coils are connected together or close to each other on the commutator segments by lapping over each other. So, lap winding used for high current and low voltage rating DC machine.

108. (A) In a DC machine induced emf given by,

$$E_g \text{ or } E_b = \frac{P\phi ZN}{60A}$$

109. (D) The effect of flux produced by the current passing through the armature conductors on the main field flux is called armature reaction. This will results in reduction in flux. As we know that, generated emf, E_g is given by,

$$E_g = \frac{P\phi ZN}{60A}$$

Hence as flux (φ) reduces then generated emf reduces.

110. (B) DC shunt generator can be made to provide constant output voltage.

111. (B) $E_g = 0.6 \times 400 = 240\ V.$

$V_{boost} = E_g - I_a(R_s + R_a) = 240 - 400$
$\times(0.2 + 0.3) = 240 - 200 = 40\ V.$

112. (B) Normally in electric traction DC series motors are employed. At above condition the back emf is greater than supply voltage hence it will operate as series generator.

113. (A) $E = \frac{\phi ZNP}{60A}$

$\Rightarrow \quad 357 = \frac{\phi \times 51 \times \times 20 \times 8500}{60} \times \frac{4}{2}$

$\therefore \ \phi = 1.2\ mWb.$

114. (A) Given critical resistance = 300 W at 800 rpm. For generator, $E_g \mu N$. So the critical field resistance also increases slightly with speed.

$$R_f = \frac{1000}{800} \times 300 = 375\ \Omega.$$

115. (D) $V = 4.44 \varphi f T$.

116. (C) Due to alternating magnetic field, the magnetic domains of a ferromagnetic material continuously change their shape and orientation. This phenomenon is called magnetostriction. Due to this the overall dimension of each laminated sheet changes according to supply frequency, hence creates a humming sound.

128. (C) Meggar used for measurement of high resistance and it has 2 terminals line and earth.

129. (A) Multimeter measures both AC / DC voltage and current. As well as it measures resistance.

130. (B) $Sensitivity = \frac{1}{5\ mA} = 200\ \Omega / Volt.$

132. (A) In deflection methods the value of the unknown quality is the determent by the help of measuring instrument having a calibrated scale indicating the quantity under the measurement directly, such as measurement by current by an ammeter. This process is also less time consuming.

134. (A) In comparison methods, the value of unknown quantity is determined by direct comparison with a standard of a given quantity. So this methods has a high accuracy of measurement.

137. (C) $L.f. = \frac{1.5\ kw}{2\ kw} = 0.75$

138. (B) 12×1000 + (1 kw × 15 × 365 × 4.50)
= 12000 + 24637.5
= Rs. 36637.5

143. (D) $S = VI^*$
= (200 + j 40) (30 + j 10)
= 5600 + 3200 j
= P + jQ

152. (D)

$$L \propto N^2$$

$$\therefore \quad N = 2000\sqrt{\frac{5}{3}} = 2582$$

$\therefore$ added no. of turns = 582

154. (C)

$$\text{Capacitance} = \frac{\epsilon A}{d} \qquad \epsilon = \epsilon_0 \epsilon_r$$

Since the two dielectrics fill space equally, the area is $\frac{A}{2}$

So $C_1 = \frac{\epsilon_0 \epsilon_1 A}{2d}, C_2 = \frac{\epsilon_0 \epsilon_2 A}{2d}$

$$C = C_1 + C_2 = \frac{\epsilon_0 A(\epsilon_1 + \epsilon_2)}{2d}$$

157. (D)

By superposition theorem

$I' = I' + I'' = \frac{1}{3} - \frac{1}{3} = 0$

where $I' \rightarrow$ current due to 1 A source after 1 V is short ckt.

and $I'' \rightarrow$ current due to 1 V source after 1 A source is open ckt.

158. (D)

$$I_L = I_S \times \frac{2}{2+j2} = 5 \times \frac{1}{1+j} = \frac{5}{\sqrt{2}} \angle -45°$$

171. (A)

Maximum power absorbed by load

$$= \frac{V_{Th}^2}{4R_{Th}}$$

Maximum power delivered by source

$$= \frac{V_{Th}^2}{4R_{Th}} \times 2$$

$$x = \frac{V_{Th}^2 / 4R_{Th}}{V_{Th}^2 / 4R_{Th} \times 2} = 50$$

$x = 50\%$

172. (C)

$$Q = \frac{Energy\ stored\ per\ cycle}{Energy\ dissipated\ per\ cycle}$$

$$Q_{new} = \frac{1.1 \times Energy\ stored}{0.9 \times Energy\ dissipated} = 1.22\, Q_{old}$$

Resonance frequency depends on L and C

$$\omega_0 = \frac{1}{2\pi\sqrt{LC}}$$

173. (B)

In series RLC circuit Z is minimum at resonace frequency viz Z = R, otherwise Z > R at all other frequencies.

At lower cut-off frequency Z > R and Z will be capacitivie in nature.

⇒ Option (b) is correct.

Similarly, at upper cut-off frequency Z > R and Z will be inductive in nature.

⇒ option (b) is correct.

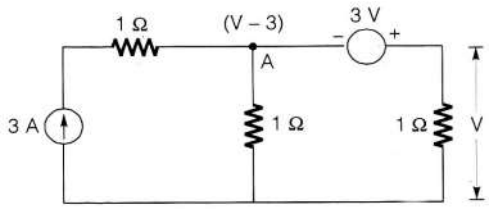
174. (B)

$L_{equivalent} = L_1 + L_2 + 2M$
$= 2 + 2 + 2\times1 = 6H$

Resonant freq. = $f_r = \frac{1}{2\pi\sqrt{LC}}$

$$= \frac{1}{2\pi\sqrt{6\times2}} = \frac{1}{4\pi\sqrt{3}}\,Hz$$

175. (C)



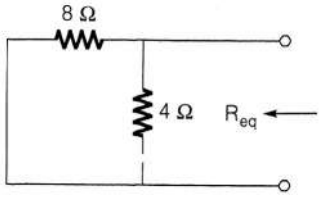
Voltage of node A = V - 3

Applying KCL at node A

$$-3 + \frac{V-3}{1} + \frac{V}{1} = 0$$

V = 3 Volt

176. (A) For maximum power transfer from source R = R_{eq}



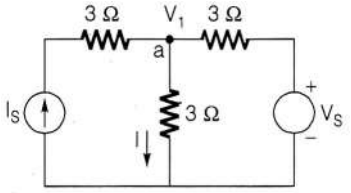
$$R_{eq} = 8 \,||\, 4 = \frac{32}{12} = \frac{8}{3}\Omega$$

$$R = R_{eq} = \frac{8}{3}\Omega$$

177. (A) When V_S = 3V

Voltage of the node a

$V_1 = I \times 3 = 4 \times 3 = 12V$



By applying KCL at node a

$$I_S = I + \frac{V_1 - V_S}{3}$$

$$= 4 + \frac{12-3}{3} = 7A$$

When V_S = 12 V

Again applying KCL at node a

$$I_S = \frac{V_1}{3} + \frac{V_1 - V_S}{3}$$

$$\Rightarrow 7 = \frac{V_1}{3} + \frac{V_1 - 12}{3}$$

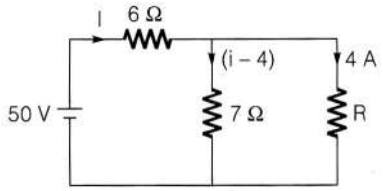
$\Rightarrow V_1$ = 16.5 V

$$I = \frac{V_1}{3} = \frac{16.5}{3} = 5.5A$$

179. (B)

In List-I resistance is analogous to conductance as both are energy dissipating elements similarly inductance is analogous to capacitance of List-II hence option (b) is correct.

180. (A)



By applying KVL in 1st loop

50 = 6i + 7 (i-4)

13i = 78

i = 6A

Now, by applying KVL in 2nd loop

7×2 = 4× R

R = 3.5 W

181. (C) Diversity factor

$$= \frac{(15000 + 12000 + 8500 + 6000 + 450)\, kw}{22000\, kw}$$

= 1.91

190. (A) Electrical charge of one electron is - 1.6×10^{-19} coulomb, hence one coulomb implies $1 / | - 1.6 \times 10^{-19} |$ or 0.625×10^{19} number of electrons.

191. (B) Current is the rate of charge transferred per second. A current of 6 ampere implies 6 coulomb charge transferred through a cross section of conductor per second. Therefore 6 ampere = 6 coulomb / second.

192. (D) Electric current is nothing but rate of flow of charge per second. Therefore, ampere = coulomb / second. Hence coulomb = ampere × second = ampere - second.

193. (D) The general equation of a current wave is, Where, f is the frequency of the current wave. Here, the given equation is

Comparing, (1) and (2) we get, $2\omega t = 2\pi ft$ or, $\omega = \pi f$ or, $f = \omega / \pi$.

194. (A) According to current division law, required current,

$$I = 1.4 \times \frac{1}{1 - (2 - 1)} = 0.25.4$$

195. (C) Mass of a proton is 1840 times greater than mass of an electron.

197. (B) Alternating current can provide any desired combination of voltage and current by means of transformer. So, resistance welding can be suitably controlled using alternating current.

198. (C) $V_{rms} = \frac{Vm}{\sqrt{2}} = \frac{2}{\sqrt{2}} = 1.414\ A$

199. (A) The current means the rate of charge transfer per second. That means current $I = Q / t$.

Here, I = 5 A, and t = 5 minutes = 5 × 60 = 300 sec. Therefore, total charge flows during 5 minutes is 5 × 300 = 1500 coulomb.