Answer-key & Solution

SSC JE (Power System)
Date 17.9.2017

1. C	13. B	25. A	37. A	49. D	61. D	73. A	85. D
2. C	14. C	26. B	38. D	50. B	62. C	74. C	86. B
3. B	15. B	27. A	39. C	51. A	63. B	75. B	87. D
4. A	16. B	28. A	40. B	52. B	64. B	76. C	88. D
5. D	17. C	29. C	41. B	53. C	65. C	77. A	89. A
6. B	18. A	30. D	42. B	54. A	66. B	78. C	90. D
7. C	19. D	31. B	43. C	55. D	67. A	79. C	
8. C	20. B	32. D	44. B	56. A	68. C	80. B	
9. D	21. B	33. D	45. B	57. A	69. A	81. B	
10. C	22. C	34. B	46. B	58. B	70. D	82. B	
11. D	23. C	35. B	47. B	59. A	71. C	83. C	
12. B	24. D	36. D	48. A	60. D	72. C	84. C	

Note : *If your opinion differ regarding any answer, please message the mock test and Question number to 9560620353*

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

SOLUTION

15. (B) Per unit impedance $Z_{(pu)}$ =

$$\frac{Z(ohms)\times(MVA)_B}{(kV)_B^2} = \frac{2\times100}{(10)^2} = 2\ pu$$

58. (B) Leakage flux in a transformer occurs because air is not a good magnetic insulator.

59. (A) 3–ϕ (LLL-G) fault is unsymmetrical fault.

61. (D) Making Current
$= 2.55 \times I_{Braking}$
$= 2.55 \times 1500 = 3.825$ kA

62. (C) To cool the machine.

63. (B) Reserve capacity
$R_C = P_C - P_{max} = 0$
∵ $P_C = P_{max}$

64. (B) Load factor and diversity factor both has direct effect on fixed cost of the unit generated.

65. (C) Load, factor,

$$P_{LF} = \frac{P_{avg}}{P_{max}}$$

$$P_{avg} = \frac{\text{Annual consumption}}{24\times365}$$

$$= \frac{700800}{24\times365}\ kW$$

$$P_{LF} = \frac{700800}{24\times365\times200} = 0.4$$

66. (B) For symmetrical fault,

$$I_f = \frac{E}{Z_1 + Z_n}$$

E = 1 p.u.
and $Z_1 = 0.5$ j
or $Z_n = 0.1$ j

$$I_f = \frac{1}{0.5j + 0.1j}$$

$$\Rightarrow I_f = -j1.67\ p.u.$$

67. (A) Diversity factor

$$= \frac{\text{Sum of individual max demand}}{\text{Max demand}}$$

$$= \frac{15000+12000+8500+6000+450}{22000} = 1.91$$

68. (C) $$P_{L1} = \frac{\text{Annual Energy Consumption}}{24\times365\times P_{max}}$$

and $$P_{LF} = \frac{\text{Daily Energy Consumption}}{24\times P_{max}}$$

$$= \frac{20}{2.4\times2} = 0.416 = 41.6\%$$

69. (A) Leakage resistance is inversely proportional the length then,

$$R \propto \frac{1}{l}$$

and $$\frac{R_1}{R_2} = \frac{l_2}{l_1}$$

$$\Rightarrow R_2 = \frac{R_1 l_1}{l_2}$$

$$\Rightarrow R_2 = \frac{1\times150}{100} = 0.5\ M\Omega.$$

70. (D) Volume of conductor $\propto \frac{1}{(\text{Voltage})^2}$

71. (C) $$P_{LF} = \frac{\text{Daily Energy Consumption}}{24\times P_{max}}$$

$$P_{LF} = \frac{24}{24\times2} = 0.5 = 50\%$$

72. (C) Load factor

$$= \frac{2000\times0.8\times12+1000\times1\times12}{2000\times24}$$

$$= \frac{24\times0.8+12}{48} = 0.65$$

73. (A) Switching of a lamp in house produces noise in radion because switching operation produced are across separating contacts.

74. (C) The small pockets of air in the high voltage cable provide Low relative permittivity high electric field and at these sites breakdown is likely to be initiated.

75. (B) $C_N = 2\ C_{AB}$
$= 2 \times 3\ \mu F = 6\ \mu F$

76. (C) Dielectric stress $\alpha = \frac{1}{\text{diameter}}$

$$\frac{\text{maximum Dielectric stress}}{\text{minimum Dielectric stress}} = \frac{D}{d}$$

77. (A) Compared to the breaking capacity of a circuit breaker, its making capacity should be more.

78. (C) Resistance switching is normally employed in air blast circuit breakers.

79. (C) Capacity factor = Load factor × utilisation factor.

80. (B) For insulation Resistance

$$R \propto \frac{1}{l}$$

$$\frac{R_1}{R_2} = \frac{l_2}{l_1}$$

$$\frac{10}{R} = \frac{8}{2}$$

R= 2.5 MΩ

81. (B) Resistance referred to high voltage side,

$R_{O2} = R_1 + k^2R_2$
$= 0.1 + (5)^2 \times 0.004$
$= 0.1 + 0.1 = 0.2\ \Omega$

Resistance referred to low voltage side,

$$R_{O1} = \frac{R_1}{k^2} + R_2$$

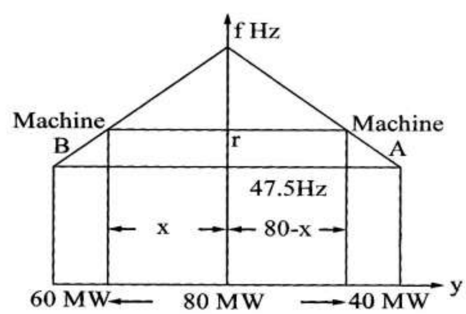
$$= \frac{0.1}{25} + 0.004$$

$R_{O1} = 0.008\ \Omega$

82. (B) Change in frequency from no load to full load

$\because$ $f_1 = 50 \times 0.05 = 2.5\ Hz$

i.e., $f_{1_{fl}} = 50 - 2.5 = 47.5\ Hz$



Since both have same speed regulation then,

$$f_{1_d} = f_{fl_2}$$

For machine A,

$$\frac{50 - f}{80 - x} = \frac{50 - 47.5}{40}$$

$\Rightarrow$ $x - 16f = 80 - 16 \times 50$

$\Rightarrow$ $x - 16f = -720$ .....(1)

For machine B,

$$\frac{50 - f}{x} = \frac{50 - 47.5}{60}$$

$\Rightarrow$ $x + 24f = 24 \times 50$

From equation (1) and (2) .....(2)

$x = 48$ MW

$f = 60$ Hz

So, machine A operates at a load of 48 MW While machine B will operate at a load of 80 – 48 = 32 MW

83. (C) Demand factor

$$\frac{P_{max}}{\text{Sum of connected load}} = \frac{1.5}{2} = 0.75$$

84. (C) Running charge annually,

= 4.5 × 1 × 15 × 365
= Rs. 24637.5

Fixed charge annually = (Rs/month) × 12
= 1000 × 12 = Rs 12000

Total annual bill = 24637.5 + 12000
= Rs 36637.5

85. (D) The string efficiency is given as

String efficiency = $\dfrac{\text{Operating voltage}}{\text{Number of disc} \times \text{voltage across the disc nearest to the conductor}}$

$$= \frac{V_0}{N \times V_c}$$

$\because$ $\dfrac{V_0}{V_c} = 0.333$ and N = 4

$\Rightarrow$ $\eta_{string} = \dfrac{1}{4 \times 0.3333}$

= 0.75 or 75%

86. (B) From the curve,

$$P_{avg} = \frac{100 \times 0.4 + 60 \times 0.3 + 40 \times 0.3}{0.4 + 0.3 + 0.3}$$

= 70 MW

P_{max} = 100 MW

(From the load duration curve)

$\Rightarrow$ Load factor $= \dfrac{P_{avg}}{P_{max}} = \dfrac{70}{100} = 0.7$

87. (D) It is defined as,

Discharge factor

$$= \frac{\text{Discharge voltage (crest value)}}{\text{Rated voltage (rms value)}}$$

$$= \frac{373\sqrt{2}}{211} = 2.5$$

88. (D) $V_a = i_a\sqrt{\dfrac{L}{C}}$

$\Rightarrow$ $V_a = 10\sqrt{\dfrac{1}{(0.01 \times 10^{-6})}}$

= 100 KV

89. (A) $P_L \propto \dfrac{1}{V^2}$

$\because$ $V_2 = 2V_1$

$$\frac{P_{L_1}}{P_{L_2}} = \left(\frac{V_2}{V_1}\right)^2 = \left(\frac{2V_1}{V_1}\right)^2 = 4$$

$\Rightarrow$ $P_{L_2} = \dfrac{P_{L_1}}{4}$

90. (D) Oil should be present.