Answer-key & Solution

SSC JE (THERMODYNAMICS)
Date 14.10.2017

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

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*

103.(B) $V_1 = 0.03\ m^3$

$V_2 = 0.06\ m^3$

P = 1 MPa

$\partial Q = 84$ KJ

from 1st law of thermodynamics

$\partial Q = du + \partial w$

$\partial u = \partial Q - \partial w$

$= \partial Q - P(.V_2 - V_1)$

$= [84 - 10^3 (0.06 - 0.03)]$KJ

$= [84 - 30]$ KJ

$\partial Q = 54$ KJ

123.(B) $M_w = 205$ kg

$M_f = 23$ kg

Enthalpy rise (Δh) = 145 kJ/kg

Calorific valve of fuel = 2050 kJ/kg

$$\text{Boiler efficiency} = \frac{\text{Enthalpy rise of water}}{\text{Heat supplied by fuel}}$$

$$\eta_{Boiler} = \frac{M_w.\Delta h}{M_f(C.V)}$$

$$= \left[\frac{205 \times 145}{23 \times 2050}\right] = 0.63043$$

In percentage

$\eta_{Boiler} = 63.043\%$

134.(C) D = 1.2m

N = 3000 rpm

$\phi = 0.42$

$$u = \frac{\pi DN}{60}$$

$$= \frac{\pi \times 1.2 \times 3000}{60} m/s$$

$u = \phi . V$

$V = u/\phi$

$$= \frac{188.5}{0.42}$$

V = 448.8 m/s

$V \simeq 450 m/s$

136.(C) $DOR = \dfrac{(\Delta H)_{Blade}}{(\Delta H)_{net}}$

$$= \frac{2/3(\Delta H)_{net}}{(\Delta H)_{net}}$$

DOR = 2/3 = 0.67

168.(D) $(COP)_{HP} = 5$

$(COP)_{Ref} = (COP)_{HP} - 1$

$(COP)_{Ref} = 4$

$W_{Ref} = 1$ kw

$$(COP)_{Ref} = \frac{R.E}{W_{Ref}}$$

$R.E = (COP)_{Ref} . W_{Ref} = 4 \times 1$

R.E = 4kw

169.(B) $\eta_{HE} = 0.3$

$$(COP)_{HP} = \frac{1}{\eta_{H.E}}$$

$$= \frac{1}{0.3}$$

$(COP)_{HP} = 3.34$

$(COP)_{Ref} = (COP)_{HP} - 1 = 3.34 - 1$

$(COP)_{Ref} = 2.34$

182.(C) $(t_{db})_1 = 15°C$

$t_{coil} = 40°C$

$(t_{db})_2 = 25°C$

$$B.P.F = \frac{t_{coil} - (t_{db})_2}{t_{coil} - (t_{db})_1}$$

$$= \frac{40 - 25}{40 - 15} = \frac{15}{25}$$

B.P.F = 0.6