Answer-key & Solution

SSC JE (Thermodynamics)
Date 15.07.2017

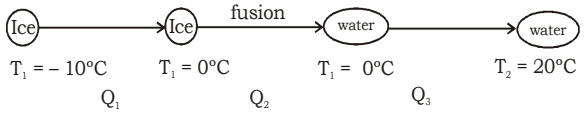
1. C	13. D	25. D	37. C	49. B	61. C	73. B	85. B
2. A	14. A	26. A	38. B	50. B	62. B	74. A	86. C
3. C	15. D	27. D	39. D	51. C	63. C	75. A	87. C
4. A	16. B	28. A	40. B	52. C	64. D	76. A	88. B
5. B	17. A	29. C	41. C	53. A	65. C	77. B	89. A
6. C	18. A	30. C	42. A	54. B	66. A	78. A	90. A
7. B	19. B	31. B	43.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

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

8.(B)



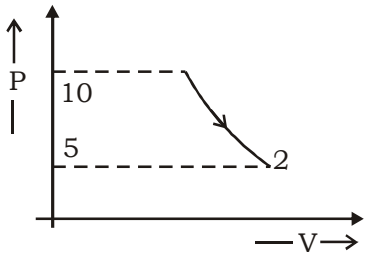
Total heat $Q = Q_1 + Q_2 + Q_3$

$Q = 1\ (Cp)_{ice}\ [0 - (-1\ 0)] + 1\ (334) + 1\ (Cp)_{water}\ (20-0)$

$Q = 2 \times 10 + 334 + 4 \times 20$

$Q = 434$ KJ

9.(C)



$w_{12} = P_1 V_1 ln \frac{V_2}{V_1}$

or $w_{12} = RT\ ln\left(\frac{P_1}{P_2}\right)$

$= 3 \times 300\ ln\left(\frac{10}{5}\right) KJ/kg$

$w_{12} = 900\ ln\ 2$ KJ/kg

13.(D) $\eta_{ser} = 1 - \frac{T_2}{T_1} = 1 - \frac{Q_2}{Q_1}$

$Q_2 = Q_1\left(\frac{T_2}{T_1}\right)$

$= 200 \times \frac{500}{1000}$

$Q_2 = 100 KJ$

15.(D) $\eta_0 = \eta_{gen}\ \eta_{Tar}\ \eta_{Boiler}$

$= 0.8 \times 0.4 \times 0.5$

$\eta_0 = 0.16\ or\ 16\%$

17.(A)Mass = 3KG

$T_\infty = 400K$

$T_1\ 300K \rightarrow T_2\ \ 400K$

dQ = M Cp. dT = 3 × 1 (400 – 300) = 300 KJ

$(ds)_{sur} = -\frac{dQ}{T_\infty} = -\frac{300}{400} = -0.75$

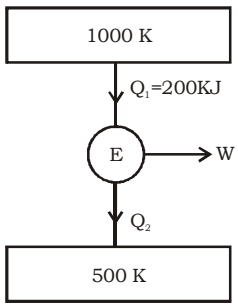
24.(A)$r_c = \alpha.\ \rho$

$\alpha = \frac{r_c}{\rho} = \frac{22}{1}.\frac{1}{2} = 11:1$

$\alpha = 11:1$

40.(B) $(COP)_{rev} = \frac{Q_2}{w} = \frac{Q_2}{Q_1 - Q_2}$

or $\frac{Q_2}{Q_1} = \frac{T_E}{T_C}$



$Q_1 = 10 \times \frac{10}{9} = \frac{100}{9} KJ$

$W_{min} = Q_1 - Q_2 = \frac{100}{9} - 10 = \frac{10}{9} KJ$

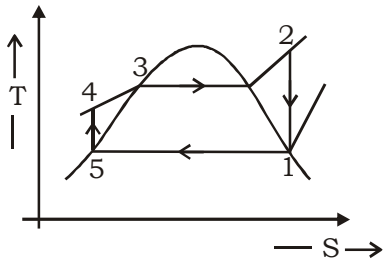
45.(B) $\phi = 0.7$. Pvs = 0.023 bar

$\phi = \frac{P_v}{P_{vs}}$

So $P_v = \phi\ P_{vs} = 0.7 \times 0.023$

$P_v = 0.0161$ bar

56.(C)



$w_T = h_2 - h_1$

$= 3159 - 2187$

$w_T = 972$ KJ/kg

and

$w_P = V_f\ dp = V_s\ (P_2 - P_1)$

$= 0.810\ (20 - 0.08)$

$w_P = 19.92$ KJ/kg

$w_{net} = w_T - w_P = 952$ KJ/kg

$\simeq 950$KJ/kg

82.(A) $T_H = 100,\ \ T_L = 500$

$\eta = 1 - \frac{T_L}{T_H} = 1 - \frac{500}{1000} = \frac{1}{2}$

$\eta = 50\%$