

EXAM 1 SOLUTIONS

1 & 2. $Work = area = \int P dV = \frac{1}{2}(10-2) \cdot 1 + 2 \times 1 = 6 J$

3 & 4. $\int P dV = \int \frac{nRT}{V} dV$ (isothermal) $= nRT \ln \frac{V_f}{V_i} = nRT \ln 2.$

BW $P_A V_A = nRT = 10 \cdot 1$ so $W = 10 \ln 2 = 6.9 J$
rounds to $7 \times 10^0 J.$

5 & 6. $P_B V_B = nRT_B$
 $P_A V_A = nRT_A$ } $\Rightarrow \frac{T_A}{T_B} = \frac{P_A V_A}{P_B V_B} = \frac{10}{4}$ $T_A = 1000 K$
 $\Rightarrow T_B = 400 K$

7 & 8. $T_C = T_A$ (isothermal path) $= 1000 K.$

9 & 10.

$Q = n C_V \Delta T = \frac{3}{2} nR \Delta T = \frac{3}{2} \cdot 6 = 9 J$

Information/Data Sheet

1. 0 1 2 3 4 5 6 7 8 9	11. 0 1 2 3 4 5 6 6 7 8 9	21. 0 1 2 3 4 5 6 6 7 8 9
2. 0 1 2 3 4 5 6 6 7 8 9	12. 0 1 2 3 4 5 6 6 7 8 9	22. 0 1 2 3 4 5 6 6 7 8 9
3. 0 1 2 3 4 5 6 6 8 9	13. 0 1 2 3 4 5 6 6 7 8 9	23. 0 1 2 3 4 5 6 6 7 8 9
4. 0 1 2 3 4 5 6 6 7 8 9	14. 0 1 2 3 4 5 6 6 7 8 9	24. 0 1 2 3 4 5 6 6 7 8 9
5. 0 1 2 3 5 6 6 7 8 9	15. 0 1 2 3 4 5 6 6 7 8 9	25. 0 1 2 3 4 5 6 6 7 8 9
6. 0 1 3 4 5 6 6 7 8 9	16. 0 1 2 3 4 5 6 6 7 8 9	26. 0 1 2 3 4 5 6 6 7 8 9
7. 0 2 3 4 5 6 6 7 8 9	17. 0 1 2 3 4 5 6 6 7 8 9	27. 0 1 2 3 4 5 6 6 7 8 9
8. 0 1 2 4 5 6 6 7 8 9	18. 0 1 2 3 4 5 6 6 7 8 9	28. 0 1 2 3 4 5 6 6 7 8 9
9. 0 1 2 3 4 5 6 6 7 8 9	19. 0 1 2 3 4 5 6 6 7 8 9	29. 0 1 2 3 4 5 6 6 7 8 9
10. 0 1 2 3 4 5 6 6 7 8 9	20. 0 1 2 3 4 5 6 6 7 8 9	30. 0 1 2 3 4 5 6 6 7 8 9