Physics 2311. Mechanics, Thermodynamics

Exam-like questions - Ch. 19. Thermodynamics

- 1. How many calories are required to change 0.5 kg of 0° C ice into liquid water at 0° C? The latent heat of fusion for water is 80 cal/g. The specific heat of water is 1.00 cal/g·K.
 - (a) 40,000 cal
 - (b) 40. cal
 - (c) 1,000 cal
 - (d) 1 cal
 - (e) 40,000 cal
- 2. Find the heat (in Joules) required to raise the temperature of 18 mL (18 g) of water from 15 to 95° C. ($c_{water} = 4186 \text{ J/(kg^{\circ}C)}, \rho_{water} = 1000 \text{ kg m}^{-3}$)
 - (a) 4200 (b) 5400 (c) 6030 (d) 72,000 (e) 600,000
- 3. 3 mol of monatomic, ideal gas changes state from P, V, T to P_f, V_f, T_f such that $T_f T = 60$ K. What is the ΔE_{int} of the system?
 - (a) 2240 J (b) 3740 J (c) 4480 J (d) 9480 J (e) 12,400 J
- 4. Express ΔE_{int} in terms of C_P for any ideal gas undergoing any process.
 - (a) $nC_P\Delta T$ (b) $n(C_P+R)\Delta T$ (c) $n(C_P-R)\Delta T$ (d) $n(2C_P+R)\Delta T$ (e) $n(2C_P-R)\Delta T$
- 5. What is the work done by 2 moles of monatomic ideal gas during an isobaric expansion at P = 202 kPa from V=0.1 m³ to 0.3 m³?
 - (a) -20 kJ (b) -40 kJ (c) 80 kJ (d) 40 kJ (e) 21 kJ
- 6. Which of these quantities does NOT have to be zero for a cyclical gas process?
 - (a) Q W (b) ΔP (c) ΔV (d) Q (e) ΔT
- 7. In a clockwise cyclical gas process, the work done by the system is found to be the area inside of the loop formed on the P vs V curve. What is Q, the heat added to the system?
 - (a) 0 (b) also the area inside the loop. (c) $p\Delta V$ (d) $nR\Delta T$ (e) minus the area inside the loop
- 8. The number of degrees of freedom of a rigid (non-vibrating), diatomic molecule is:
 - (a) 2 (b) 3 (c) 4 (d) 5 (e) 6