Worksheet: Thermodynamics

NIOS · Class 11 · Physics · 10 questions · 31 marks

Name: _____ Date: _____ Score: _____ / 31

Q1. A gas absorbs 500 J of heat and does 200 J of work. Find the change in internal energy. *[2 marks]*

Q2. Why can a heat engine never have 100% efficiency? *[2 marks]*

Q3. According to the law of equipartition of energy, what is the molar specific heat of a solid at ordinary temperature, and what is its approximate numeric value? *[2 marks]*

Q4. 2 moles of an ideal gas expand isothermally at 300 K from 5 L to 15 L. Find the work done (R = 8.314 J/mol/K). *[3 marks]*

Q5. A monatomic ideal gas is compressed adiabatically to 1/8 of its original volume. By what factor does its pressure increase? *[3 marks]*

Q6. For a diatomic gas at ordinary temperature, Cv = 5R/2. Find Cp and gamma. *[3 marks]*

Q7. A Carnot engine operates between a source at 600 K and a sink at 300 K, absorbing 1000 J from the source per cycle. Find the efficiency and the heat rejected to the sink. *[3 marks]*

Q8. In a cyclic process, a system absorbs 1000 J of heat and rejects 600 J. Find the net work done and the efficiency. *[3 marks]*

Q9. A Carnot engine absorbs 800 J from a reservoir at 400 K and rejects heat to a sink at 250 K. Find (a) the efficiency, (b) the work done per cycle, (c) the heat rejected per cycle. *[5 marks]*

Q10. 1 mole of a monatomic ideal gas at 300 K expands adiabatically until its volume doubles. Find the final temperature and the work done by the gas (R = 8.314 J/mol/K). *[5 marks]*