2nd Semester (B.Sc.-H) Final Internal Examination-2020
Department of Physics
Prabhat Kumar College, Contai
Paper-GE-2 (Thermal Physics and Statistical Mechanics)

Group-A (Theory)
(Answer any one of the following)

1) i) State first law of thermodynamics. For adiabatic process, prove that PV^{γ}= Constant from 1st law of thermodynamics, where γ ($=C_P/C_V$) is the ratio of two specific heats and other symbols have their usual meanings.
   ii) Find the work done for n mole of ideal gas (PV=nRT) in isothermal (T=constant) process.
2) Prove that
   i) $C_P - C_V = R$ for one mole ideal gas.
   ii) the ratio of adiabatic bulk modulus to isothermal bulk modulus is equal to γ, where $\gamma = C_P/C_V$.
3) State second law of thermodynamics and concept of entropy (S). Find the expression of efficiency of reversible Carnot's engine in cyclic process.
4) Write Maxwell's four thermodynamic relations and prove two of them.
5) Prove $C_P - C_V = VT\alpha^2/\beta$, where α= coefficient of volume expansion at constant pressure, β=compressibility at constant temperature and the other symbols have their usual significance.

Group-B (Practical)
(Answer any one of the following)

1. To determine Stefan's constant.
   a) Working formula.
   b) Circuit diagram.
2. To determine the coefficient of thermal conductivity of Cu by Searle's Apparatus.
   a) Working formula.
   b) Error calculation.
3. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disk method.
   a) Working formula.
   b) Bedford correction.
4. To determine the temperature coefficient of resistance by Platinum resistance thermometer.
   a) Working formula with temperature correction.
   b) Circuit diagram.
5. To study the variation of thermo emf across two junctions of a thermo couple with temperature.
   a) Working formula.
   b) Circuit diagram.

Answer script submitted to doppkc@gmail.com