Sarsuna College

B. Sc. Semester – III Internal Examination, 2020

Subject: Physics (General)

Paper: PHS-G-CC-3-3-P

(Thermal Physics and Statistical Mechanics**-**Practical)

Answer scripts (pdf format) to be submitted at: <u>sarsunacollegephsg@gmail.com</u>

F.M. : 30   **Time: 1½ hours**

Answer any **one** question

1. (a) Write down the theory (with working formula and circuit diagram) to verification of Stefan's law of radiation by the measurement of voltage and current of a torch bulb glowing it beyond draper point. [8]

(b) What is draper point? [3]

(c) Draw the calibration curve (R_t/R_d vs. T), where R_t and R_d are the resistances of the torch bulb filament at t^0C and draper point respectively. T is the absolute temperature. [3]

(d) Why does the resistance of the filament increase with temperature? [4]

(e) Draw the ($\log_{10}$P vs. $\log_{10}$T) graph, where P is the net amount of heat radiated per sec per unit time and T is the absolute temperature of the blackbody. [4]

(f) From the above ($\log_{10}$P vs. $\log_{10}$T) graph, how can you determine the value of the power of the absolute temperature T? [3]

(g) State Stefan's law of radiation? [2]

(h) How does Newton's law of cooling differ from Stefan's law of radiation? [3]

2. (a) Write down the theory (with working formula) to determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method. [8]

(b) Draw the cooling curve (θ vs. t), where t is the time and θ is the corresponding temperature. [4]

(c) What are the factors on which the rates of cooling depend? [4]

(d) What is temperature gradient? [2]

(e) Define thermal conductivity. What is its unit? Does thermal conductivity depends on the dimension of the substance?   [6]

(f) What is Bedford's correction? Can you perform the experiment without introducing this correction? [6]