Gurudas College (University of Calcutta)

B. Sc. Semester III, Examination, 2020

Subject: PHYSICS (Honours)

Paper: CC6 Practical

Time: 1:30 hr (Including sending answer script in email)

Full marks: 30

Answer any one question from below.

1. Experiment: To determine thermal conductivity of a bad conductor in the form of disc by the Lees and Charlton method.

   a) Write down detailed theory of this experiment with picture clearly specifying the every parts of the experimental set up. 10

   b) What do you mean by steady state temperature of the lower disc? What is the difference between steady state and thermal equilibrium (both cases temperature does not change)? 2+2

   c) Briefly describe the procedure of determination of rate of cooling $\frac{d\theta}{dt}$ at steady temperature of lower disc. What is Bedford correction ? Find out the correction factor . 3+2+3

   d) Find out formula of maximum percentage of error of thermal conductivity of this experiment. 4

   e) What is the dimension of thermal conductivity? 2

   f) Is it possible to find out conductivity of conductor by this method? 2

   2) Experiment: Determine the thermo electric power at a given temperature using a thermocouple.

   a) Write down detailed theory of this experiment with circuit clearly specifying the every parts of the experimental set up. 10

   b) How you measure resistance of the wire of the potentiometer using P. O. box? Draw the circuit for this measurement. 5

   c) Why potentiometer is used here to determine thermo -emf instead of voltmeter? 2

d) What is Seebeck effect? What is Peltier effect? 2+2

e) Draw a curve of thermo-emf vs. hot junction temperature when other junction is kept at $0°C$. Specify the neutral temperature and inversion temperature. 2+2

f) What is the dimension of thermoelectric power? 2

g) Find out formula for maximum percentage of error of thermoelectric power. 3

3) Experiment: To determine the melting point of a solid with a thermocouple.

a) Write down detailed theory of this experiment with circuit clearly specifying the every parts of the experimental set up. 10

b) How you measure resistance of the wire of the potentiometer using P. O. box? Draw the circuit for this measurement. 5

c) Why potentiometer is used here to determine thermo -emf instead of voltmeter? 2

d) What is Thomson effect? What is Joule effect? 2+2

e) Write the expression of thermo-emf when hot junction temperature is at $t°C$ and other junction is kept at $0°C$ of a thermocouple. Determine the inversion temperature and neutral temperature in terms of constants in the expression of thermo emf. 1+2+2

f) Are the melting point and freezing point are same for all material? 2

g) What is the meaning of calibration curve? 2