Ex./1P/SO2/06/19 (OLD)

BACHELOR OF SCIENCE EXAMINATION - 2019

(1st Year, 1st Semester, OLD)

Subject : Physics (subsidiary)

Paper –SO2

Time: Two Hours Full Marks: 50

Answer any ***four*** questions.

1. a) State and explain 1st law of Thermodynamics. Which state function do you obtain from this law?

   b) Distinguish between isothermal and adiabatic process.

   c) Show that the work done by an ideal gas to change from a state $(P1, V_1)$ to a state $(P2, V_2)$ in adiabatic process is

$$\frac{P_1V_1 - P_2V_2}{1-\gamma}$$

3.5+3+6 = 12.5

2. a) Describe the Carnot's reversible cycle. Show that the efficiency of a Carnot's engine working between a source and sink at absolute temperature $T_1$ and $T_2$ respectively is $1 - T_2/T_1$.

   b) The efficiency of a Carnot's cycle is 1/6. If the temperature of the sink is reduced by 65 K, the efficiency becomes 1/3. Find out the temperature of the source and sink.

2.5+6+4 = 12.5

3. State the basic assumptions of kinetic theory of gases. From this assumptions, derive the expression of pressure of a gas. 4+8.5 = 12.5

4. a) What do you mean by degrees of freedom?

   b) Explain Maxwell's velocity distribution law of gas molecules with suitable diagram. Hence find out the most probable velocity. 4+8.5 = 12.5

5. What was the reason for modifying the gas equation by vander Waal? What are the corrections suggested by him. Deduce the critical constants of the gas. 3+3+6.5 = 12.5

6. Write short notes on any two.

b) Entropy

c) Work done in isothermal process

d) 2nd Law of thermodynamics

e) Zeroth law of thermodynamics 12.5