Roll No. .....

41272

B. Sc. (Hons.) Physics 4th Semester Examination – May, 2019

THERMAL PHYSICS - I

Paper : Phy-402

Time : Three hours] ***[Maximum Marks : 40***

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting at least ***two*** question from each Unit. Use of Scientific (non programmable) calculator is allowed

UNIT – I

1. (a) Describe carnot's cycle and deduce the efficiency of ideal heat engine. 4

   (b) Enunciate the second law of thermodynamics. Deduce from this the thermodynamically scale of temperature. Discuss how this scales is related to the perfect gas scale. 4

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2. (a) Derive Clapeyron's Latent heat equation $\frac{dP}{dt} = \frac{L}{T(v_1 - v_2)}$. Also Discuss how the boiling point of a liquid and melting point of a solid are affected by change of presssure. 5

(b) A Carnot's ref takes heat from water at 0°C and discards, it to a room at 27°C . 1 kg of water at 0°C is to be changed into ice at 0°C. How many calories of heat are discarded to the room ? What is the cofficient of performance of Machine. 2

(c) What are limitations of first Law of Thermodynamics. 1

3. (a) What is Joule-Thomson effect ? Obtain an expression for the cooling produced in a Vander weal gas. Explain why hydrogen show heating effect at ordinary temperature. 4

(b) Calculate the change inentropy, when 10 gm of water at 100°C is converted into steamat the same temperature. 2

(c) "Entropy is measure of disorder." Justify the statement. 2

4. (a) Define entropy. What is it plesiscal signifiacane ? Derive an expression for change in entropy of a perfect gas in terms of pressure and temperature. 5

[illegible]/2

(a) Derive Maxwell's four thermodynamically relations. 4

(b) Explain cooling due to adiabatic demagnetisation. 4

(a) Explain the phenomena of Conversion of magnetic temperature to kelvin temperature (near absolute zero). How are such temperature measured. 4

(b) Using Maxwell's thermodynamically relation, Discuss the variation of intrinsic energy with volume for a perfect gas and a gas obeying vander Waal's equation. 4
