(i) Printed Pages :2 Roll No. .....

(ii) Questions :7

Sub. Code : 0346

Exam. Code: 0004

B.A/B.Sc.(General) 4th Semester

1046

PHYSICS

Paper :A Statistical Physics and Thermodynamic-II

Time Allowed: Three Hours] **[Maximum Marks : 22**

Note :- (l) Attempt five questions in all,selecting two each from unit I and unit II unit III is compulsory.
(2) All questions carry marks as indicated.
(3) Non -Programmable Calculators are allowed.
(4) Logarithmic Tables can be asked.

UNIT-I

I. (a) Find the relation for the entropy of one mole ofan Ideal gas 2

(b) Find the change in entropy of one mole of carbon dioxide, When its absolute temperature is increased by 3 times and process of-heating is :

(i) Isochoric
(ii) Isobaric 1,1

II. (a) Define and find expression for thermo EMF and peiltier co-efficient and Thomson Coefficient 2

(b) The entropy of v = 3.0 moles of an ideal gas Increases by $\Delta S = 23\ JK^{-1}$ due to isothermal expansion. How many timed should the volume of the gas be increased or decreased ? 2

III. (a) How does Heat pump differ from Refrigerator '? Prove that the amount of mechanical energy required to extract a given amount of heat from a cold body increases with decrease in temperature of the body, for a given temperature of sink. 2

(b) A heat engine employing a Carnot cycle with an efficiency of $\eta = 20\%$ is used as a refrigerating machine, the thermal reservoir being the same. Find its refrigerating efficiency. 2

UNIT-II

IV. (a) Derive Clapeyron's equation from Maxwell's relations and explain the change of ice to water on the basis of it. 2

(b) Making use of MaxWell's thermodynamical relation prove) that cooling is produced when the substance Which contracts on heating is compressed. 2

V. (a) What are thermodynamic potentials ? What is their significances Deduce the relation $\left[\ \partial T/\partial\ V\ \right]_s$ = radiate $[\partial P/\partial S]_V$ 2

(b) Derive thermodynamically an expression for Joule Thomson CO-efficient. Show that for a perfect gas Joule thomson effect vanishes. 2

VI. (a)Find an expression for the change in temperature of wire stretched adiabatically. 2

(b)Prove that the speCific heat at constant volume for aVander Waal gas is equal to the specific heat at constant volume for a perfect gas. 2

UNIT-III(Compuslory)

VII. Attempt any **six** parts:

(1)How will the entropy change during the free expansion of a gas?

(2)Find the change in the energy of System if 300 j work is done on it, while 63 calories of heat flows out of it

(3)Write the ClausiuS-Clapewron equation. What is its significance ?

(4)Correct representation of first law of thermodynamics is ($\partial Q = dU + \partial W$) and not ($dQ = dU + dW$) why?

(5)How does free electron gas differ from ordinary gas ?

(6)Why Seebeck effect is not an independent effect ?

(7)Two Stars radiate maximum energy at wavelength 3.0×10^{-5}cm and 5.0×10^{-7}m respectively. what is the ratio of the temperature ? 6x1=6