(iv) Distinguish between Bose-Einstein and Fermi system.

(v) What is Bose-Einstein condensation ? Why it is called disorder-order transition ?

(vi) Show the jump in specific heat in the light of G-L theory.

(vii) Write down the total energy for an ideal and non-ideal gas.

(viii) Show that partition function

$$Z = 2 \Pi KT / h\omega,$$ for an oscillator

defined by energy $E = p^2/2m + 1/2\, mw^2q^2$

(ix) State the difference between Pauli Paramagnetism and Langevin Paramagnetism.

(x) State the difference between Red giant star and White Dwarf star.

2. What do you mean by ensembles ? Distinguish between different ensembles. Obtain the thermodynamics for ideal gases.   10

(Continued)

3. (a) What is degenerate gas ? Find out the Fermi energy of electron in single particle states.   5

(b) The molar mass of Lithium is 0·00694 and density is 0·53 × 10^3 Kg/m³. Calculate the Fermi energy and Fermi Temperature of the electrons.   5

4. How can a White Dwarf star be understood in terms of degenerate gas ? Calculate the pressure for White Dwarf star. What is the Chandrasekhar limit for White Dwarf star ?   5

5. How do you understand partition function ? With low density approximation find the average energy of the interacting system.   10

6. A particle can exit in one of the two states ($|0>$ and ($|1>$). Obtain distribution function for Bose-Einstein system.   10

7. Write short notes on any two :

(i) Virial expansion

(ii) Gibb's paradox   10

(Turn Over)