PART – B

Answer **any five** of the following. **Each** question carries **4** marks.   **(5×4=20)**

Common data :

$h = 6.625 \times 10^{-34} Js$; $k = 1.38 \times 10^{-23} JK^{-1}$

$c = 3 \times 10^8 \, ms^{-1}$; $m_e = 9.1 \times 10^{-31} Kg$

9. The rms velocity of hydrogen molecules at NTP is 1.84 Kms^{-1}. Calculate the rms velocity of oxygen molecules at NTP. Given molecular weight of hydrogen and oxygen are 2 and 32 respectively.

10. A system has only two particles, show with diagram how these particles can be arranged in three quantum states 1,2,3 using Bose Einstein statistics.

11. The number of conduction electrons per m^3 in silver is 5.85×10^{28} and in lithium is 4.7×10^{28}. If the Fermi energy of silver is 5.48 eV, Calculate the fermi energy of lithium.

12. Find the phase velocity and group velocity of an electron whose de-Broglie wavelength is 1.8Å (neglect relativistic effect).

13. In the Davisson and Germer's experiment electrons of energy 100eV incident on the lattice planes of a crystal produce a strong Bragg's reflection in the first order. Calculate the glancing angle. Given the lattice spacing to be 2.15Å.

14. The position and momentum of 0.4KeV electrons are simultaneously determined. If the position is located within 1Å, what is the uncertainty in its momentum.

15. At what height the pressure of the atmosphere becomes 40% of the pressure at the sea level.Given scale height is 8.5km.

16. Calculate the coriolis force at a hill station at 30°N having a zonal wind speed of 20ms^{-1}.