



**Menoufia University – Faculty of Engineering – Physics dep.  
Jan 2017 - Final Exam in Solid State Physics – Time : 3 hours**

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**Answer the following questions:**

**Q1: a) Write notes on : Electronic theory of metals – Hall effect**

**b) If the relaxation time  $\tau$  , Prove that the conductivity  $\sigma$  for metals**

**is given by:-**  
$$\frac{\lambda n e^2 C}{3KT}$$

**Q2: a) Discuss with details Fermi – Dirac Statistics ?**

**b) Using Fermi - Dirac statistics to find maximum thermodynamically cases macaronic varied group of four points inside 2 cells respective four rooms?**

**Q3: a) Explain Zones Theory ?**

**b) Explaining the conductive material ,the insulating and semiconducting according to the theory of Brillouin Zones?**

**Q4: a) Write notes on : Lattice defects ( points defects – dislocation )**

**b) Prove that the equilibrium concentration of vacancies is given by :-**

$$C = \exp \frac{\Delta S}{k} \cdot \exp - \frac{\Delta E}{kT}$$

-----GOOD LUCK ----- Dr. Mohamed Aboelez -----