قسم :   الفيزياء   **المادة : فيزياء جوامد و ليزر**
الفرقة : الرابعة   نظام قديم   **الزمن : ٣ ساعات**

اجب عن خمسة اسئلة فقط :
السؤال الأول : (٣٢ درجة)

A)   Complete the table for a conductor materials.   (٢٠ درجة)

Brillouin Zone dimensions'	-π/a	-π/2a	0	π/2a	π/a
Effective mass of electron	*M**	*Maximum*	*M**	*Maximum*	M*
Electron Energy	*Maximum*	*middle*	*zero*	*middle*	*Maximum*
Effective number of electron	Empty	*Top*	---	*Top*	*Empty*
Electron velocity	*zero*	*Maximum*	**zero**	*Maximum*	*Zero*

B) If N is the number of atom in the crystal , the number of electrons in one band is equal to :

A)   A) 2N   b) N   c) ½ N   (١٠ درجات)
     Ans: a) 2N

السؤال الثانى : (32 درجة)

1- Why   K.P Model succeeded to differentiate between metals and insulators , whereas Bloch model failed

Ans: *K.P model classified the solid to three bands with different properties and established a relation between effective mass of conduction electron and the energy of conduction band , which is the main factor in differentiate between the metals and insulator , on the other hand Bloch's model is a propagation and modulation for the electron energy related to lattice constant not else, and did not talked about energy band .*