

Physics

Section I – Part B (continued)

Marks

Question 24 (8 marks)

In terms of band structures and relative electrical resistance, describe the differences between a conductor, an insulator and a semiconductor. 8

Conductor: the band structures ~~are~~ ^{have a smaller 'forbidden gap'} and allow the flow of ^{more} electrons. This reduces the need for electrons to 'jump' the gap and results in ~~low~~ electrical resistance.

Insulator: the bandstructure has a significant 'forbidden gap' ^{or nullifying} reducing the amount of electrons which can 'jump' over. Because of this, ^{or little} no electrical current ~~is~~ can pass through the material. This results in a high electrical resistance.

Semi-conductors: the 'forbidden gap' is ~~significant, but only~~ in between ~~at a certain temperature when it is cooled~~ the gap gets smaller ~~and~~ that of a conductor & insulator. it allows ~~the~~ controlled flow of electrons. These have a ~~low~~ low-moderate resistance depending on its use.