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falling between that of a conductor, such as metallic copper, and an insulator, such as glass. Its resistivity falls as its temperature rises; metals are the opposite. Its conducting properties may be altered in useful ways by introducing impurities ("doping") into the crystal structure. When two differently-doped regions exist in the ...

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The basic function of such a device is to switch ON and OFF the flow of electricity as and when required. A semiconductor device can perform the function of a vacuum tube with hundreds of times its volume. A single integrated circuit (IC), such as a



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microprocessor chip, can do the work of a set of vacuum tubes.

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a = ka Forbidden energy bands  
(a)  $ka = \pi$   $\cos ka = -1$  1st point  
...

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Problem Solutions Chapter 3 3.1 If  
a  $\phi_0$  were to increase, the bandgap  
energy would decrease and the  
material would begin to behave  
less like a semiconductor and  
more like a metal. If a  $\phi_0$  were to  
decrease, the bandgap energy  
would increase and the material  
would begin to behave more like  
an insulator. 3.2 wave equation  
is:  $\nabla^2 \psi + k^2 \psi = 0$  Assume  
the solution is of the form:  $\psi = E e^{j(kx - \omega t)}$   
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