

Question 27 (4 marks)

There are two areas in which energy savings can be made by the use of superconductors. 4

These are:

- electricity generation and transmission;
- transportation.

Discuss how energy savings can be achieved in each of these two areas.

• In electricity generation and transmission, there is considerable power loss in the form of heat. $P = IV$ and power loss = I^2R . Since superconductors have no resistance, there will be ~~less~~ no or less heat loss. Therefore superconductors will save energy.

• Superconductor using transportation such as Maglev trains use the superconducting property to operate magnetically levitated trains in Japan. These trains can travel in excess of 500 km/h saving time and energy as trains today need to burn coal.