

**Question 27 (4 marks)**

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

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- electricity generation and transmission;
- transportation.

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

Electricity generation does not require a large iron core and only requires a fraction of the size of a normal generator if superconductors are used. This saves energy as energy is not lost in the generation of eddy currents. The use of superconductors in transmission lines allows no power or current to be lost as there is no electrical resistance and hence can not create heat/kinetic energy in order to lose power. Also transmission lines can be thinner.

Superconductors can be used in maglev trains. These trains use less energy because there is no friction against the train and the tracks. Instead magnets and superconductors cause the train to levitate and essentially glide to other places. The frictionless path allows energy to be saved.