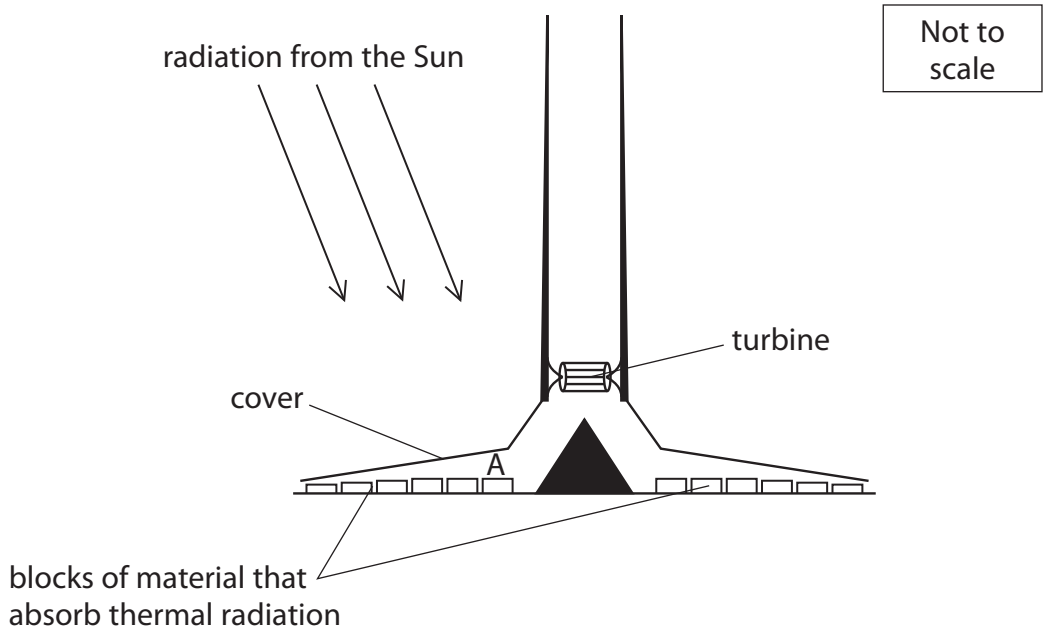
12 An experimental solar updraft tower (SUT) was built in the south of Spain.

This part of Spain has little rainfall and is hot in summer months.

The SUT was used as a 50 kW electricity generator.

The diagram shows the component parts of the tower.

The cover allows visible light to pass through but traps infrared. Rows of blocks under the cover absorb thermal radiation.



(a) (i) Explain what happens to the air at A just under the cover.

(3)

(ii) On the diagram, mark the directions of the air movements over the blocks of material and through the turbine.

(2)

(iii) State the name of this effect.

(1)

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(b) (i) Complete the energy transfer diagram for a SUT.

(2)

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(ii) Describe how a SUT can be used to generate electricity.

(2)

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(c) (i) Suggest why the SUT generates most electricity during daylight hours.

(1)

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(ii) Suggest why there are blocks of material that absorb thermal radiation in the SUT.

(1)

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(iii) Suggest an alternative to these blocks that would improve the total energy output of the SUT.

(1)

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(Total for Question 12 = 13 marks)

TOTAL FOR PAPER = 120 MARKS