

- 5 The photograph shows a halogen lamp.



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- (a) The halogen lamp has a power of 50 W when operating at its normal voltage.

Calculate the amount of electrical energy transferred to the halogen lamp in 40 hours.
(3)

electrical energy transferred = J

- (b) A student notices that in addition to producing light, the lamp also gets hot.

She concludes that the lamp cannot be 100% efficient.

Explain whether the student's conclusion is correct.

(2)

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- (c) The lamp must not be connected directly to mains voltage.

A step-down transformer must be used.

Describe the structure of a step-down transformer.

You may draw a diagram to help your answer.

(3)

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- (d) A step-down transformer reduces voltage from 230 V to 12 V.

The secondary current is 4.2 A.

- (i) State the equation linking input power and output power for a transformer.
[assume that the transformer is 100% efficient]

(1)

- (ii) Calculate the primary current.

(3)

primary current = A

(Total for Question 5 = 12 marks)

