

- 3 Mobile phone charger X contains a transformer and is used to charge the phone's battery.

Diagram 1 shows the information on charger X.

Input voltage = 230V
Output voltage = 5.0V
Output current = 1.2 A

Diagram 1

- (a) (i) The power of the charger can be calculated using the formula

$$\text{power} = \text{current} \times \text{voltage}$$

Calculate the output power of charger X.

(2)

output power = W

- (ii) Calculate the input current to charger X.

Assume that charger X is 100% efficient.

(3)

input current = A



(b) Charger X transfers a charge of 10 500 C to the mobile phone battery.

(i) State the formula linking charge, current and time.

(1)

(ii) Calculate the time in minutes to transfer a charge of 10 500 C to the battery.

(3)

time = minutes

(iii) Charger Y can also be used to charge the mobile phone battery.

Diagram 2 shows the information label for charger Y.

Input voltage = 230V
Output voltage = 5.0V
Output current = 2.1 A

Diagram 2

Explain how the time taken to transfer the same amount of charge to the mobile phone battery will be affected when charger Y is used instead of charger X.

(2)

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(c) Both chargers contain step-down transformers.

Explain how a step-down transformer works.

You may include a diagram to support your answer.

(4)

(Total for Question 3 = 15 marks)



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