3.23 Electromagnetic Induction and Transformers: 10-minute Pack

AQA 8464 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A magnet is moved in and out of a coil of wire connected to a sensitive voltmeter.

(a) State three factors that increase the size of the potential difference induced across the coil. **(3)**

(Total for Question 1 is 3 marks)

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2 A transformer changes the size of an alternating potential difference.

(a) State what a transformer is used for. **(1)**

(b) Explain why a transformer only works when connected to an alternating current (a.c.) supply, and not to a direct current (d.c.) supply. **(2)**

(Total for Question 2 is 3 marks)

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3 A transformer has more turns on its secondary coil than on its primary coil.

(a) State whether this is a step-up or a step-down transformer. **(1)**

(b) State the effect this transformer has on the size of the potential difference and the size of the current, between the primary and secondary coils. **(2)**

(Total for Question 3 is 3 marks)

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Mark scheme · 3.23 Electromagnetic Induction and Transformers: 10-minute Pack

Question 1

(a) using a stronger magnet (a stronger magnetic field) **B1**

(a) moving the magnet faster (a greater speed of movement) **B1**

(a) increasing the number of turns on the coil **B1**

(a) Answer: A stronger magnet, moving the magnet faster, and using a coil with more turns.

Question 2

(a) to change (step up or step down) the size of an alternating potential difference (voltage), oe **B1**

(a) Answer: To change the size of an alternating potential difference.

(b) an alternating current in the primary coil produces a constantly changing magnetic field in the iron core, oe **M1**

(b) this changing field induces a (changing) potential difference in the secondary coil by electromagnetic induction; a direct current would produce a constant, unchanging field, so no pd would be induced, oe **A1**

(b) Answer: An a.c. supply produces a constantly changing magnetic field in the core, which induces a pd in the secondary coil. A d.c. supply produces a constant field, so no pd would be induced.

Question 3

(a) step-up **B1**

(a) Answer: Step-up

(b) the potential difference increases (the secondary pd is greater than the primary pd) **B1**

(b) the current decreases (the secondary current is smaller than the primary current) **B1**

(b) Answer: The potential difference increases, and the current decreases, from primary to secondary.

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