

Electromagnetic Induction

Question Paper

Level	GCSE
Subject	Physics
Exam Board	Edexcel IGCSE
Module	Single Award (Paper 2P)
Topic	Magnetism & Electromagnetism
Sub-Topic	Electromagnetic Induction
Booklet	Question Paper

Time Allowed: 59 minutes

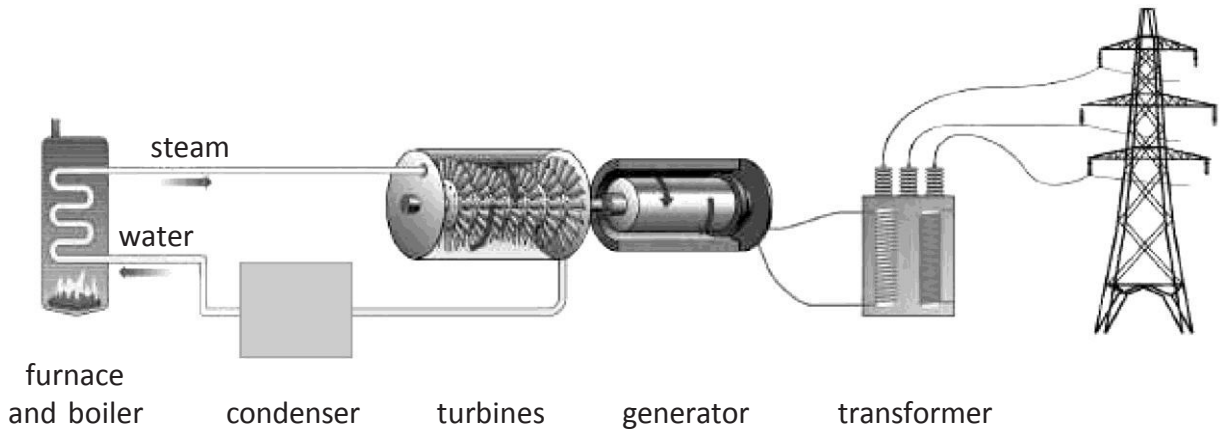
Score: /49

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	70%	60%	55%	50%	<50%

1. The diagram shows a coal-fired power station.



(a) (i) In which part of the power station is heat energy usefully converted to kinetic energy?

(1)

- A boiler
- B turbine
- C generator
- D wires

(ii) In which part of the power station is kinetic energy usefully converted to electrical energy?

(1)

- A boiler
- B turbine
- C generator
- D wires

2. A laptop battery charger contains a step-down transformer.



(a) The number of turns on the primary coil of a step-down transformer is

(1)

- A the same as the number of secondary turns
- B more than the number of secondary turns
- C less than the number of secondary turns
- D zero

(b) This transformer is designed to reduce the voltage from 230 V to 12 V.

The primary current is 0.25 A.

(i) State the equation linking primary voltage, primary current, secondary voltage and secondary current for a transformer.

(1)

(ii) Calculate the secondary current, assuming that the transformer is 100% efficient.

(2)

Secondary current = A

(c) A student notices that the charger becomes warm when it is working.

Suggest how this will affect the output of the transformer.

(2)

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(Total for Question 2 = 6 marks)

3. A wind turbine generates electricity for the National Grid.



(a) The useful energy transfer in the wind turbine is

- A** chemical energy to electrical energy
- B** gravitational potential energy to electrical energy
- C** kinetic energy to electrical energy
- D** sound energy to electrical energy

(1)

(c) The generator provides a direct current (d.c.).

This d.c. is changed to an alternating current (a.c.).

The frequency of the alternating current is 50 Hz.

(i) Explain the meaning of **50 Hz alternating current**.

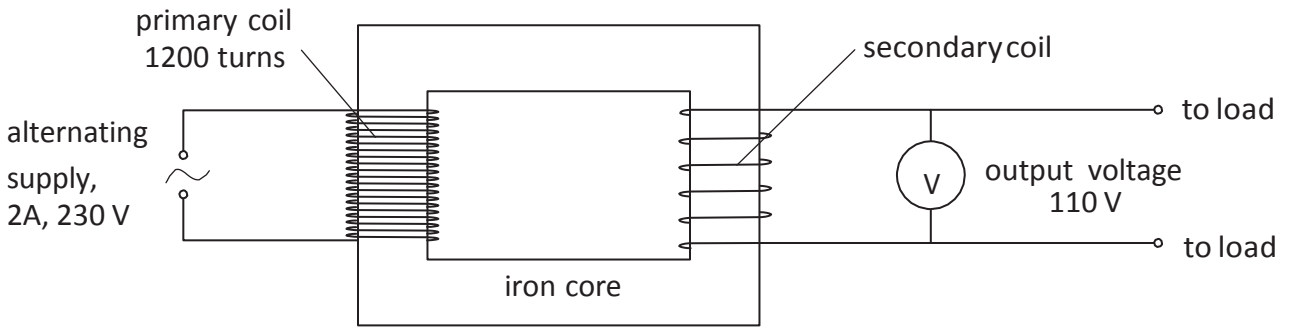
(2)

(ii) Explain why the d.c. from the generator must be changed to a.c. before it is transmitted.

(2)

(Total for Question 3 = 12 marks)

4. The diagram shows a transformer that is 100% efficient.



(a) (i) State the equation linking input power and output power for the transformer. (1)

(ii) Calculate the output current of the transformer. (2)

output current = A

(b) (i) State the equation linking input voltage, output voltage and turns ratio for the transformer. (1)

(ii) Calculate the number of turns on the secondary coil of the transformer. (2)

number of turns =

(c) Explain how a transformer works.

In your answer, you should include the reasons for using

two coils

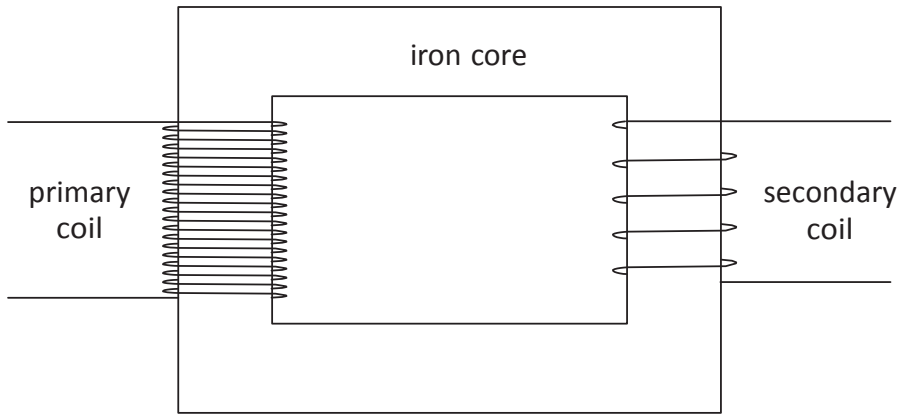
an iron core

an alternating supply

(5)

(Total for Question 4 = 11 marks)

5. The diagram shows parts of a transformer.



(a) The input voltage to the transformer is 230 V a.c.

The output of the transformer is 25 V a.c.

There are 100 turns on the secondary coil.

(i) Name the type of transformer shown in the diagram.

(1)

(ii) State the equation linking input (primary) voltage, output (secondary) voltage, primary turns and secondary turns.

(1)

(iii) Calculate the number of turns on the primary coil.

(2)

number of turns

(b) Explain how a transformer works.

In your answer, you should include the reasons for using

two coils

the iron core

an alternating supply

(5)

(Total for Question 5 = 9 marks)