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EDEXCEL GCSE PHYSICS: QUESTIONS BY TOPIC

Electromagnetic Induction (13)

GCSE Physics (Foundation) Topic 13

2 questions · 15 marks · Mark schemes included

Pearson Edexcel GCSE (9-1) Physics 1PH0, Foundation Tier, June 2018 - June 2025

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HOW TO USE THIS BOOKLET

Questions run from the lowest mark tariff to the highest, so similar questions sit together.
Click any row below to jump straight to that question.
On every question page, click ANSWER in the top-right corner to jump to its mark scheme.
Diagrams, graphs, tables and data are printed exactly as they appeared in the original papers.

	QUESTION	SOURCE	MARKS	PAGE
1.	**Q1**	Paper 2 June 2018	6	**4**
2.	**Q5**	Paper 2 June 2023	9	**7**

QUESTIONS

2 questions · 15 marks · lowest tariff first

6-MARK QUESTIONS

1 question in this booklet

1 (a) Complete the following sentences using one of the phrases from the box below.

efficiency is reduced the national grid a power station heat loss is reduced a transformer

(i) Electrical power is generated at

(1)

.....

(ii) Electricity is transmitted over long distances by transmission lines that are part of

(1)

.....

(iii) Electricity is transmitted at high voltages so that

(1)

.....

(b) Which statement is true for transformers?

(1)

☐ **A** Transformers can only step-up voltages.

☐ **B** Transformers can only step-down voltages.

☐ **C** Transformers can work with direct current.

☐ **D** Transformers have primary and secondary coils.

(c) In a small transformer

- the primary voltage is 230 V
- the primary current is 0.020 A
- the secondary voltage is 5.0 V

Calculate the secondary current.

Use the equation

$$I_s = \frac{V_p \times I_p}{V_s}$$

(2)

secondary current = ... A

(Total for Question 1 = 6 marks)

9-MARK QUESTIONS

1 question in this booklet

5 Figure 11 shows part of the UK National Grid system for the supply of electricity to homes.

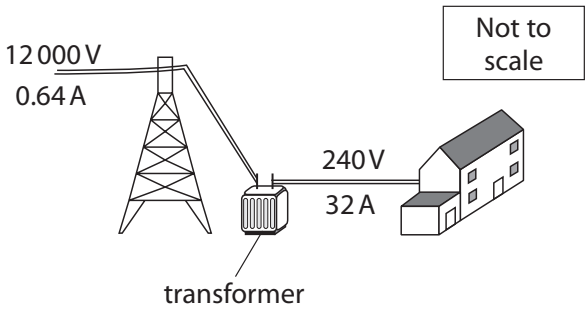

Figure 11

(a) Electricity supplied to homes has a frequency of

(1)

- ☐ **A** 0.02 Hz
- ☐ **B** 20 Hz
- ☐ **C** 50 Hz
- ☐ **D** 500 Hz

(b) Explain why the National Grid uses high voltages with small currents to transfer electricity from power stations.

(2)

.....

.....

.....

.....

(c) Figure 12 shows details of a transformer.

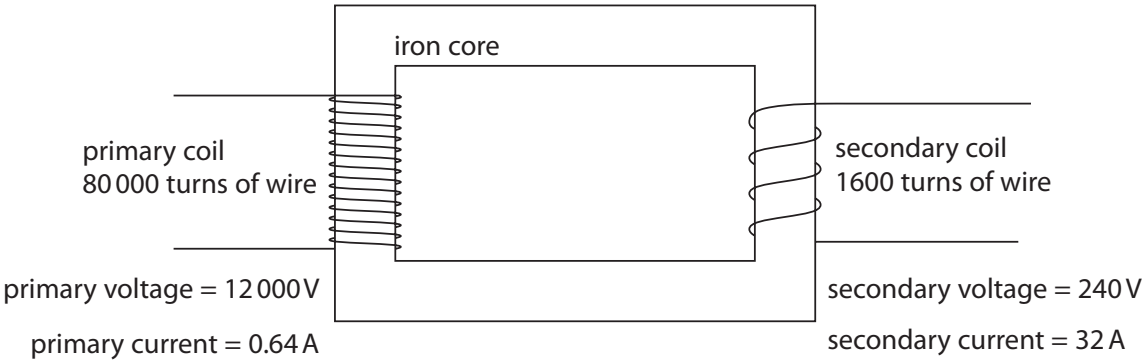

Figure 12

(i) Calculate the power in the primary coil.

Use the equation

$$P = V \times I$$

(2)

power in the primary coil = ... W

(ii) Calculate the following for the transformer in Figure 12.

$$\frac{\text{number of turns in secondary coil}}{\text{number of turns in primary coil}}$$

(2)

.....

(iii) For the transformer in Figure 12, evaluate, in its simplest form, the ratio

secondary voltage : primary voltage

(2)

..... : .....

(Total for Question 5 = 9 marks)

MARK SCHEMES

official Pearson Edexcel mark schemes

Question Number:	Answer	Mark
1(a)(i)	a power station	**(1)** AO 1 1

Question Number:	Answer	Mark
1(a)(ii)	the national grid	**(1)** AO 1 1

Question Number:	Answer	Mark
1(a)(iii)	heat loss is reduced	**(1)** AO 1 1

Question Number:	Answer	Mark
1(b)	D transformers have primary and secondary coils. **The only correct answer is D** ***A*** *is not correct because transformers can step-up and step-down voltages* ***B*** *is not correct because transformers can step-up and step-down voltages* ***C*** *is not correct because transformers only work with alternating current*	**(1)** AO 1 1

Question Number:	Answer	Additional Guidance	Mark
1(c)	substitution (1) $(I_s) = \frac{230 \times 0.02}{5.0}$ evaluation (1) 0.9(A)	accept 0.92 (A) award full marks for the correct answer without working	**(2)** AO 2 1

(Total for Question 1 = 6 marks)

Question number	Answer	Mark
5 (a)	**C** 50 Hz A, B and D are all distracting numbers not matching the frequency of the mains	(**1**) AO1

Question number	Answer	Additional guidance	Mark
5(b)	explanation linking any two from: (smaller currents) reduce heating effect (in cables) (1) less energy / power wasted (in cables) (1) increases efficiency (1)	accept thermal energy for heat energy allow will not get (as) hot / heat loss is reduced allow 2 marks for 'reduce(s) heat energy loss'	(2) AO1

Question number	Answer	Additional guidance	Mark
5 (c) (i)	substitution (1) (power =) 12000 x 0.64 evaluation (1) R = 7700 (W)	 allow (power =) 240 x 32 any answer that rounds to 7700 (W) e.g. 7680 (W) award full marks for the correct answer without working	(**2**) AO3

Question number	Answer	Additional guidance	Mark
5(c) (ii)	substitution (1) ($\frac{\text{number of turns in secondary coil}}{\text{number of turns in primary coil}}$ =) $\frac{1600}{80000}$ or $\frac{1}{50}$ evaluation (1) 0.02(0)	0.02(0) to any other power of 10 scores 1 mark award full marks for correct answer without working accept for 1 mark (seen anywhere) $\frac{50}{1}$, $\frac{80000}{1600}$, 50 **or** (from counting turns) $\frac{4}{15}$, 0.27	(2) AO2

Question number	Answer	Additional guidance	Mark
5(c) (iii)	(ratio =) 240 : 12000 (1) 1 : 50 (1)	0.02 : 1 award full marks for correct answer without working	(**2**) AO2

Total for Q5 = 9 marks