

**WJEC Physics GCSE Topic  
1.9: Electromagnetism  
Mark Schemes for Questions by topic**

1.

Question			Marking details	Mark
3.	(a)	(i)	steps-down	1
		(ii)	440	1
		(iii)	has a changing magnetic field	1
	(b)	<p><b>Any 2 ×(1):</b>  <u>changing</u> magnetic field (1) which links (or cuts) the secondary coil / passes through the secondary coil (1) <u>induces</u> a current or voltage (1)  <b>To award both marks both statements must be linked.</b></p>	2	
<b>Question total</b>				<b>[5]</b>

2.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)	2	Coil (1) – in right blank Magnet[s] (1) – in left blank	N pole / S pole		Wire Pole
	(ii)	1	Wires or coil or it cuts field [lines] Or magnetic flux through the coil changes	Passes through field lines		Splitting field lines Reference to electromagnetic induction
(b)	(i)	1	Amplitude doubled ± 1 small square tolerance <b>and</b> with one and a half cycles shown for whole of graph			
	(ii)	2	At least one peak and one trough but all drawn must have amplitude doubled (1) ± 1 small square tolerance 3 cycles shown for whole of graph (1)			
(c)	(i)	I	D			
		II	D			
		III	E			
		IV	6 [V]			
	(ii)	2	<p><b>HT only</b>            e.g. <math>\frac{10}{150} = \frac{500}{N_2}</math> or <math>\frac{150}{10} = \frac{N_2}{500}</math> (1-subst)  <math>N_2 = 7\,500</math> (1)</p>	Ratio of 1:15 on the turns award 1 <sup>st</sup> mark		
TOTAL		FT = 10 HT = 12				

3.

Question		Marking details	Mark
4.	(a)	U	1
	(b)	(i) coil A because it has the bigger voltage of the two [both points required for the mark] or it's a step-down transformer or A has less current	1
		(ii) to set up a changing magnetic field [in the iron core] don't accept moving	1
		(iii) to transfer / link the <u>field</u> into coil B	1
		(iv) The <u>changing magnetic field</u> induces a voltage in coil B (cutting is neutral)	1
		(v) $\frac{230}{12} = \frac{18400}{N_2}$ [1 sub] $N_2 = 18400 \times \frac{12}{230}$ $N_2 = 960$ (1)	2
		<b>Question total</b>	<b>[7]</b>

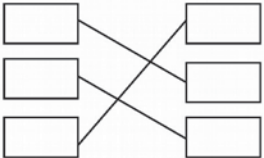
4.

Question		Marking details	Mark
1.	(a)	circles accept concentric (on its own) or rings. <b>don't accept</b> oval or clockwise	1
	(b)	reverses [direction] accept changes direction / anticlockwise / opposite direction. Treat as neutral references to N & S.	1
	(c)	no magnetic field / field disappears / field stops <b>don't accept</b> less field	1
		<b>Question total</b>	<b>[3]</b>

5.

Question		Marking details	Mark
1.	(a)	correct shape with no lines crossing & 2 lines minimum (1 on the top and 1 on the bottom ignore the middle) (1) direction (1)	2
	(b)	(i) <u>stronger</u> / accept more lines / <u>bigger</u> / increases	1
		(ii) <u>stronger</u> / accept more lines / <u>bigger</u> / increases	1
		(iii) reverses direction / opposite direction / goes the other way	1
		<b>Question total</b>	<b>[5]</b>

## 6.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	2	 <p>All 3 lines correct – 2 marks 1 or 2 lines correct – 1 mark More than one line drawn from or to a box – loses 1 mark</p>	Accept curved lines joining boxes		
(b)	3	All 4 labels in correct places – 3 marks 2 or 3 labels correct – 2 marks 1 label correct – 1 mark Accept complete terms only			
(c)	1	Magnetic field left to right across the diagram Arrow can be drawn anywhere	Not having a label		Curved line
(d)	2	<b>Any 2 × (1) from:</b> <ul style="list-style-type: none"> <li>• weaker magnet,</li> <li>• fewer turns on coil,</li> <li>• smaller current / lower voltage [cell or battery],</li> <li>• smaller [area] coil</li> </ul>	Fewer coils /shorter coil / move magnets further apart / add a resistor / less field lines / smaller or decrease magnetic field		Smaller magnets / remove wires
(e)	1	<b>Any 1 from:</b> <ul style="list-style-type: none"> <li>• reversing the magnetic field / swap N + S [poles around] or magnets</li> <li>• reversing the cell/battery / change polarity of battery</li> <li>• reversing the current</li> </ul>			Reversing cell <u>and</u> magnetic field / change the current
Total	9				