Question Number	Answer	Mark
*15(a)	This question assesses a student's ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning.	

This question assesses a student's ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning.

Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning.

The following table shows how the marks should be awarded for indicative content.

Number of indicative marking points seen in answer	Number of marks awarded for indicative marking points	Max structure mark available	Max final mark
6	4	2	6
5	3	2	5
4	3	1	4
3	2	1	3
2	2	0	2
1	1	0	1
0	0	0	0

The following table shows how the marks should be awarded for structure and lines of reasoning.

	Number of marks awarded for structure of answer and sustained line of reasoning
Answer shows a coherent and logical structure with linkages and fully sustained lines of reasoning demonstrated throughout	2
Answer is partially structured with some linkages and lines of reasoning	1
Answer has no linkages between points and is unstructured	0

Guidance on how the mark scheme should be applied: The mark for indicative content should be added to the mark for lines of reasoning. For example, an answer with five indicative marking points which is partially structured with some linkages and lines of reasoning scores 4 marks (3 marks for indicative content and 1 mark for partial structure and some linkages and lines of reasoning). If there are no linkages between points, the same five indicative marking points would yield an overall score of 3 marks (3 marks for indicative content and no marks for linkages).

	Indicative content:		
	IC1: Wire cuts lines of magnetic flux **Or** Wire cuts magnetic field lines **Or** flux <u>linkage</u> of wire changes	**(1)**	
	IC2: <u>Induces e.m.f.</u>	**(1)**	
	IC3: so current in loop of wire	**(1)**	
	IC4: Current in a wire in a magnetic field experiences a force **Or** <u>Magnetic</u> field associated with this current	**(1)**	
	IC5: Due to Lenz's law there is a force opposing the motion of the wire **Or** Upward force exerted on wire as the field is such to oppose the change that creates it	**(1)**	
	IC6: Opposite, downward force on magnets, so balance reading increases **Or** Newton's 3rd law - downward force on magnets, so balance reading increases	**(1)**	**6**
15(b)	Use of area swept out = $l \times h$ Use of $t = s/v$ Use of $\varphi = BA$ Use of $\varepsilon = d\varphi/dt$ Max p.d. = 0.026 V	**(1)** **(1)** **(1)** **(1)** **(1)**	**5**
	<u>Example of calculation</u> $A = 0.034 \text{ m} \times 0.020 \text{ m} = 0.00068 \text{ m}^2$ $t = 0.020 \text{ m} / 2.2 \text{ m s}^{-1} = 0.0091 \text{ s}$ $\varphi = 0.35 \text{ T} \times 0.034 \text{ m} \times 0.020 \text{ m} = 0.000238 \text{ Wb}$ Emf = (0.35 T × 0.034 m × 0.020 m) / (0.020 m /2.2 m s^{-1}) Max p.d. = 0.026 V		
	Total for question 15		**11**