

Question Number	Answer	Mark
17(a)	<p>Use of $\varphi = BA$ with $A = dl$ and $l = vt$ (1)</p> <p>Use of $\varepsilon = -\frac{d(N\varphi)}{dt}$ (1)</p> <p>$\varepsilon = 3.9 \times 10^{-4} \text{ V}$ (1)</p> <p><u>Example of calculation</u></p> <p>$\varphi = BA = B \times d \times l = B \times d \times v \times t$</p> <p>$N = 1$</p> <p>$\varepsilon = \frac{d\varphi}{dt} = \frac{B \times d \times v \times t}{t} = B \times d \times v$</p> <p>$\varepsilon = 0.15 \text{ T} \times 7.5 \times 10^{-2} \text{ m} \times 3.5 \times 10^{-2} \text{ m s}^{-1} = 3.94 \times 10^{-4} \text{ V}$</p>	3
17(b)	<p>(By Lenz's law, if there were a complete circuit) the (direction of the) induced e.m.f. is such as to oppose the change that produces it (1)</p> <p>(With a current) there would be a force to the right (opposing the motion)</p> <p>Or There would be a force in the direction opposite to the motion (1)</p> <p>So e.m.f. is from P to Q (1)</p>	3
Total for question 17		6