

It is not departmental policy to provide complete specimen answers to past examination papers. However, to help you in revision, numerical values and similar information are given below so that you can check your attempts. If you have attempted past questions and wish to discuss the descriptive questions or the details of your calculations, please see me!

Dr Booth

Question 1

- a) Field is $1.53 \times 10^5 \text{ V m}^{-1}$ at 25° anticlockwise from the x -axis.
- b) Internal resistance 0.14Ω ; EMF 1.60 V .
- c) Combined resistance 6.2Ω .
- d) $C_{\text{new}} = k C$.
- e) Change in potential is -510 V .
- f) Speed is $2.9 \times 10^5 \text{ m s}^{-1}$.
- g) Zero potential at $x = \frac{9}{11} L$ and $\frac{9}{7} L$.

Question 2

- d) Charge is $3.7 \times 10^{-10} \text{ C}$; energy is $1.5 \times 10^{-8} \text{ J}$; time is $3.2 \times 10^{-5} \text{ s}$.

Question 3

- b)i) Torque is $5.7 \times 10^{-4} \text{ N m}$ clockwise (or into the plane of the paper).
- ii) Change in potential energy is $1.1 \times 10^{-3} \text{ J}$ (increase).
- c)ii) $E \simeq -\frac{6Qd^2}{4\pi\epsilon_0 x^4}$
- iii) Field is -14 V m^{-1} .