

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

Numerical values:

Question 1

- a) Force is 0.46 N at 43° clockwise from the x -axis.
- b) Total resistance is $2\frac{3}{4} R$.
- c) Time is 35 s; energy dissipated 1.6×10^{-3} J.
- d) Resistance at 100°C is 7.82 Ω ; temperature for 5.50 Ω is 1.8°C.
- e) Mean time between scattering collisions is 2.5×10^{-14} s.

Question 2

b)i) Total charge is $Q = \pi\rho_0 R^3$.

ii) For $r > R$, $E = \frac{\rho_0 R^3}{4\epsilon_0 r^2}$.

ii) For $r < R$, $E = \frac{\rho_0 r^2}{4\epsilon_0 R}$.

c)ii) For $r > R$, $V(r) = \frac{\rho_0 R^3}{4\epsilon_0 r}$.

c)iii) For $r < R$, $V(r) = \frac{\rho_0}{12\epsilon_0} \left(4R^2 - \frac{r^3}{R} \right)$.