1 **(a)** Use an expression for work done, in terms of force, to show that the SI base units of energy are $\text{kg m}^2\text{ s}^{-2}$.

[2]

(b) **(i)** The energy E stored in an electrical component is given by

$$E = \frac{Q^2}{2C}$$

where Q is charge and C is a constant.

Use this equation and the information in **(a)** to determine the SI base units of C.

SI base units ..... [2]

(ii) Measurements of a constant current in a wire are taken using an analogue ammeter.

For these measurements, describe one possible cause of:

1. a random error

.....

.....

2. a systematic error.

.....

.....

[2]

[Total: 6]