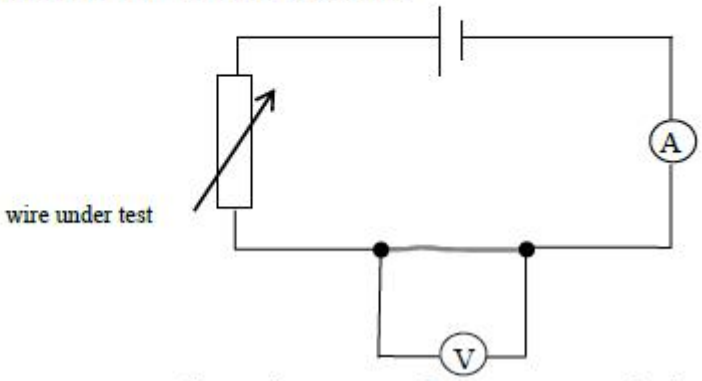
Name of the Student:_____

Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)	• correct circuit (1) • metre rule (1) • micrometer (1)	Example of circuit diagram:  Accept use of an ohmmeter for MP1 provided there is no power supply Accept use of fixed resistor	**(3)**

Downloaded from www.merit-minds.com

Question Number	Acceptable Answer	Additional Guidance	Mark
(b)	• for different values of *I* calculate corresponding values of *R* using *R* = *V*/*I* (or using an ohmmeter) (1) • plot a graph of *R* against *I* (1) • determine gradient of the graph (1) • measure <u>diameter</u> of the wire and calculate the cross sectional area of the wire using $\pi d^2/4$ (1) • use ρ = gradient × *A* (1)		**(5)**

Question Number	Acceptable Answer	Additional Guidance	Mark
(c)	• sensible precaution	<u>Examples of precautions:</u> measure the diameter of the wire at different places and find a mean / check for a zero error on the micrometer / make sure that the wire is straight	**(1)**

Downloaded from www.merit-minds.com

Q2.

Question Number	Acceptable Answers	Additional Guidance	Mark
(a)	A description that makes reference to **two** of the following: • No need for further calculation **Or** gives a value for resistance without calculation **(1)** • No need for an additional power supply **(1)** • Uncertainties caused by two devices is (possibly) greater than that caused by one device **(1)**	Do not accept more precise **or** no parallax **or** quicker	**2**

Question Number	Acceptable Answers	Additional Guidance	Mark
(b)(i)	• (As applied force increases) the length (l) (of wire) increases/stretches **Or** the wire is longer **(1)** • the resistance increases with reference to $R = \frac{\rho l}{A}$ **(1)**	Reference to formula may be in terms of proportionality or direct quote of equation Do not accept change in resistivity	**2**

Question Number	Acceptable Answers	Additional Guidance	Mark
(b)(ii)	• Use of $GF = \frac{\Delta R}{\epsilon R}$ **(1)** • Substitution of $\epsilon = \frac{\Delta w}{w}$ into GF equation **(1)** • $\Delta w = 2.5 \times 10^{-5}$ m **(1)**	(x may seen in place of w) Example of calculation: $GF = \frac{\Delta R}{\epsilon R}$ $2 = \frac{0.001}{\Delta w / (5 \times 10^{-2})}$ $\Delta w = 2.5 \times 10^{-5}$ m Accept 2.5×10^{-3} cm / 2.5×10^{-2} mm	**3**

Question Number	Acceptable Answers	Additional Guidance	Mark
(c)	An explanation that makes reference to the following: • As small changes (in w) are multiplied many times **Or** can use a longer wire (on a small gauge) **Or** to achieve a greater change in the length **(1)** • (So) greater sensitivity **Or** larger changes in R (for a given change in width) **(1)**		**2**

Downloaded from www.merit-minds.com