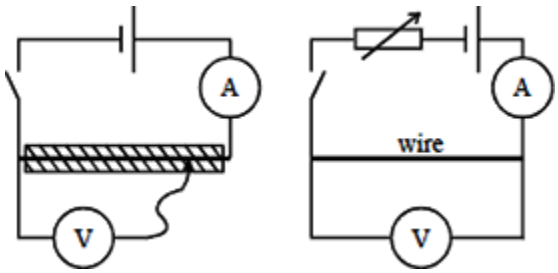
**Name of the Student**:_____
**Max. Marks : 21 Marks** **Time : 21 Minutes**

Mark Schemes

## Q1.

(a) (i)




**(1)** battery, wire, (variable resistor) and ammeter in series
**(1)** voltmeter connected across wire

(ii) ($\alpha$) (with switch closed) measure $I$ and $V$ **(1)**
move contact along the wire **(1)** (or length of wire changed)
measure new ($I$ and) $V$ **(1)**
measure $l$ each time **(1)**

or ($\beta$) measure $I$ and $V$ **(1)**
change variable resistor **(1)**
measure new $I$ and $V$ **(1)**
$l$ known **(1)**

(iii) $R = \frac{\rho l}{A}$ or $\rho = \frac{RA}{l}$ or $\rho = \frac{A}{l} \times \frac{V}{I}$ **(1)**

($\alpha$) obtain gradient of graph of $V$ or $R$ vs $l$ **(1)**
$A$ (and $I$) known, hence $\rho$ **(1)**

or ($\beta$) gradient of graph of $V$ vs $I$ **(1)**
$A$ and $l$ known, hence $\rho$ **(1)**

[or, for both methods, measure $R = \frac{V}{I}$ for each length **(1)**

take mean and hence $\rho$ **(1)**

**9**

(b) (use of $V = IR$ gives) $R = \frac{240}{2 \times 10^{-3}}$ **(1)** ( = $120 \times 10^3$ (Ω))

$$\rho = \left(\frac{RA}{l}\right) = \frac{120 \times 10^3 \times 80 \times 80 \times 10^{-6}}{1.5 \times 10^{-3}}$$ **(1)**

(allow C.E. for value of $R$)
= 5.1 × $10^5$ Ω m **(1)**

**3**

(c) four resistors in series **(1)**
$R$ = 4 × (120 × $10^3$) = 4.8 × $10^5$Ω **(1)**
(allow C.E. for value of $R$)

**2**

**[14]**

## Q2.

(a) (i) length of card
[or distance travelled by trolley A] **(1)**
time at which first light gate is obscured
[or time taken to travel the distance] **(1)**

(ii) time at which second light gate is obscured
[or distance travelled after collision and time taken] **(1)**

**3**

(b) momentum = mass × velocity **(1)**
mass of each trolley **(1)**
(check whether) $p_{initial} = p_{final}$ **(1)**

**max 2**

(c) incline the ramps **(1)**
until component of weight balances friction **(1)**
[or identify where the friction occurs **(1)**
sensible method of reducing **(1)**]

**2**

**[7]**