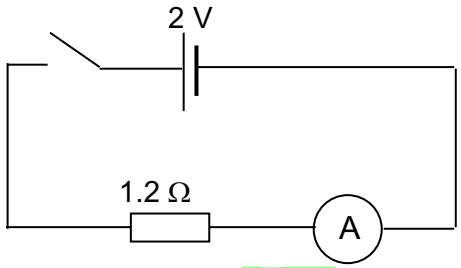
NANYANG GIRLS' HIGH SCHOOL
2021 Sec 4 Physics Practical 02

Marking Scheme

Part 1 (total : 11 marks)

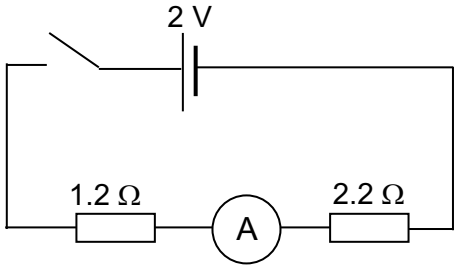
c) [1]



Precision of ammeter: 0.01 A

d) The value of $\mathbf{I_1}$ should not be greater than 2 A (0.91 A) and must be in **2 d.p.** [1]

f) [1]



Precision of ammeter: 0.01 A (if correct for both precisions) [1]

g) The value of $\mathbf{I_2}$ should not be greater than 1 A (0.6 A) and must be in **2 d.p.** [1]

Questions

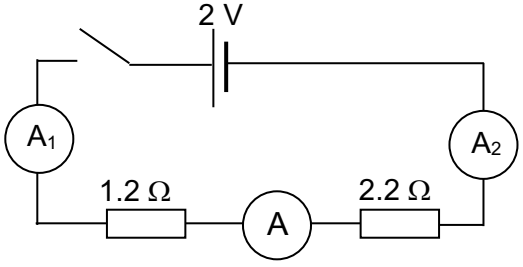
1 Current = 2.0 / 2.2 = 0.91 A [1]

2 The calculated value $\mathbf{I_1}$ is higher as the e.m.f. is divided by a lower total resistance of the circuit, where the internal resistance of the ammeter is assumed to be zero.

OR resistance of the wires were taken to be negligible. [1]

3 Move the existing ammeter to positions A_1 and A_2 as shown in the diagram and measure the current flowing through at those positions. The readings should be the same. [1]

The additional ammeters will increase the resistance of the circuit significantly because the resistance of the circuit is rather low.



[1]

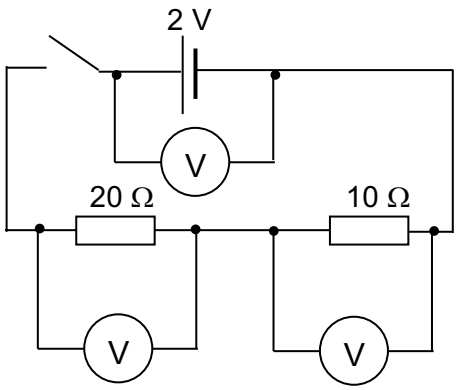
4 Use a screwdriver or a coin to turn the screw attached to the ammeter needle in front until the error is corrected. [1]

5 Place your eye directly above the needle and adjust the position of the eye until the image of the pointer in the mirror coincides (or aligns) with the pointer. [1]

Part 2 (total: 9 marks)

a) Precision of voltmeter = 0.05 V (half the smallest division) [1]

b)



Main circuit [1]
Voltmeter connection [1]

c) $\mathbf{V_{AB}}$, $\mathbf{V_{BC}}$ and $\mathbf{V_{AC}}$ must have a reading with correct 2 d.p.[1] and unit [1]

Note :

($\mathbf{V_{AB}}$ + $\mathbf{V_{BC}}$) may not add up to $\mathbf{V_{AB}}$ due to experimental error like poor connections.

e) Table of $\mathbf{V_{AB}}$, $\mathbf{V_{BC}}$ and $\mathbf{V_{AC}}$ completed to correct 2d.p [1] and has NO units [1]

f) ***Conclusion***

$\mathbf{V_{AB} + V_{BC} = V_{AC}}$ [1]

OR

sum of p.d.s across the resistors in series = e.m.f. across accumulator

(or resistor+rheostat in series)

(Note : if the readings are not equal, the student must explain the reason)

Question

1 With the additional 2 V accumulator, the total e.m.f. of the circuit will increase to 4 V. When the voltmeter is used to measure $\mathbf{V_{AC}}$, the needle will exceed its maximum deflection range (3 V). [1]

Note:

- e.m.f. = electromotive force
- e.m.f. across/of a accumulator/battery
- p.d. across a resistor/component
- **NOT** e.m.f. / p.d. passing through a component / circuit