Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic: Electricity

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Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Mark Schemes

Q1.

(a) *(use of R = ρl/A)*
A = 9.7 × 10^{-8} × 0.50/0.070 ✔

1

A = 6.929 × 10^{-7} (m^2) ✔

1

diameter = √(6.929 × 10^{-7} × 4/π) = 9.4 × 10^{-4} (m) ✔
CE for third mark if incorrect area

1

(b) R = 1.5/0.66 = 2.3(Ω) (2.27) ✔

1

(c) *(use of V = IR)*
I = 1.5/(22 + 1.2) = 0.065✔(A) (0.0647) ✔

1

(d) current in R_1 = 0.66 − 0.0647 = 0.595 (A) ✔
CE from 4.2/4.3

1

resistance of R_1 and probe = 1.5/0.595 = 2.52 (Ω) ✔
alternative method: 1/2.3 = 1/23.2 + 1/(R_{probe} + 2.4) ✔

1

resistance of probe = 2.52 − 2.4 = 0.12 (Ω) ✔
correct rearrangement ✔
range 0.1 – 0.15 ✔
accept 1 sig. fig. for final answer

1

(e) cross-sectional area must decrease OR R α 1/A
indicated by downward arrow or negative sign which can be seen on answer line

1

area decreases by 1.6% hence diameter must decrease by 0.8% ✔
accept 1%

1

(f) ANY TWO FROM
correct reference to lost volts OR terminal pd OR reduced current ✔
reference to resistors not changing OR resistors constant ratio ✔
reference to voltmeter having high/infinite resistance (so not affecting circuit) ✔
reference to pd between AB being (very) small (due to closeness of resistance ratios in each arm) ✔

voltmeter (may not be) sensitive enough ✔

1
1

[12]

Q2.

(a) emf is the work done / energy transferred by a voltage source / battery / cell ✓per unit charge ✓
OR
electrical energy transferred / converted / delivered / produced ✓
per unit charge ✓
OR
pd across terminals when no current flowing / open circuit ✓ ✓

not in battery

accept word equation OR symbol equation with symbols defined if done then must explain energy / work in equation for first mark

2

(b) (i) by altering the (variable) resistor ✓

1

(ii) reference to correct internal resistance ✓

e.g. resistance of potato (cell)

terminal pd = emf □ pd across internal resistance / lost volts ✓
pd / lost volts increases as current increases OR as (variable) resistance decreases greater proportion / share of emf across internal resistance ✓

accept voltage for pd

3

(iii) draws best fit straight line and attempts to use gradient ✓
uses triangle with base at least 6 cm ✓
value in range 2600 – 2800 (Ω) ✓

3

stand-alone last mark

(c) total emf is above 1.6 V ✓
but will not work as current not high enough / less than 20 mA ✓

2

[11]