

**PHYSICS PAPER 3**

**MARKING SCHEMS**

**Question1**

(v) Table of results

x (cm)	5.0	10.0	15.0	20.0	25.0	30.0	
u (cm)	33.0	31.0	29.0	28.0	27.0	26.0	± 2 -3mrks
v (cm)	38.0	41.0	44.0	48.0	52.0	56.0	
(u +v )cm	71.0	72.0	73.0	76.0	79.0	82.0	± 2 -3mrks
uv (cm <sup>2</sup> )	1254	1271	1276	1344	1404	1456	-1mrk

(vi) See the graph on the grid below

(a)  $\text{Slope} = \frac{D u + v \sqrt{1}}{D uv}$   
 $= \frac{(78 - 75)\text{cm} \sqrt{1}}{1400 - 1328}$  must be shown on the graph.  
 $= \frac{4}{72\text{cm}}$   
 $= \frac{1}{18\text{cm}^{-1}}$   
 $= 0.05556\text{cm}^{-1} \sqrt{1}$

(b)  $1/f = 1/u + 1/v$   
 $1/f = \frac{u+v}{Uv}$

$u+v = uv/f \sqrt{1}$  correct evaluation

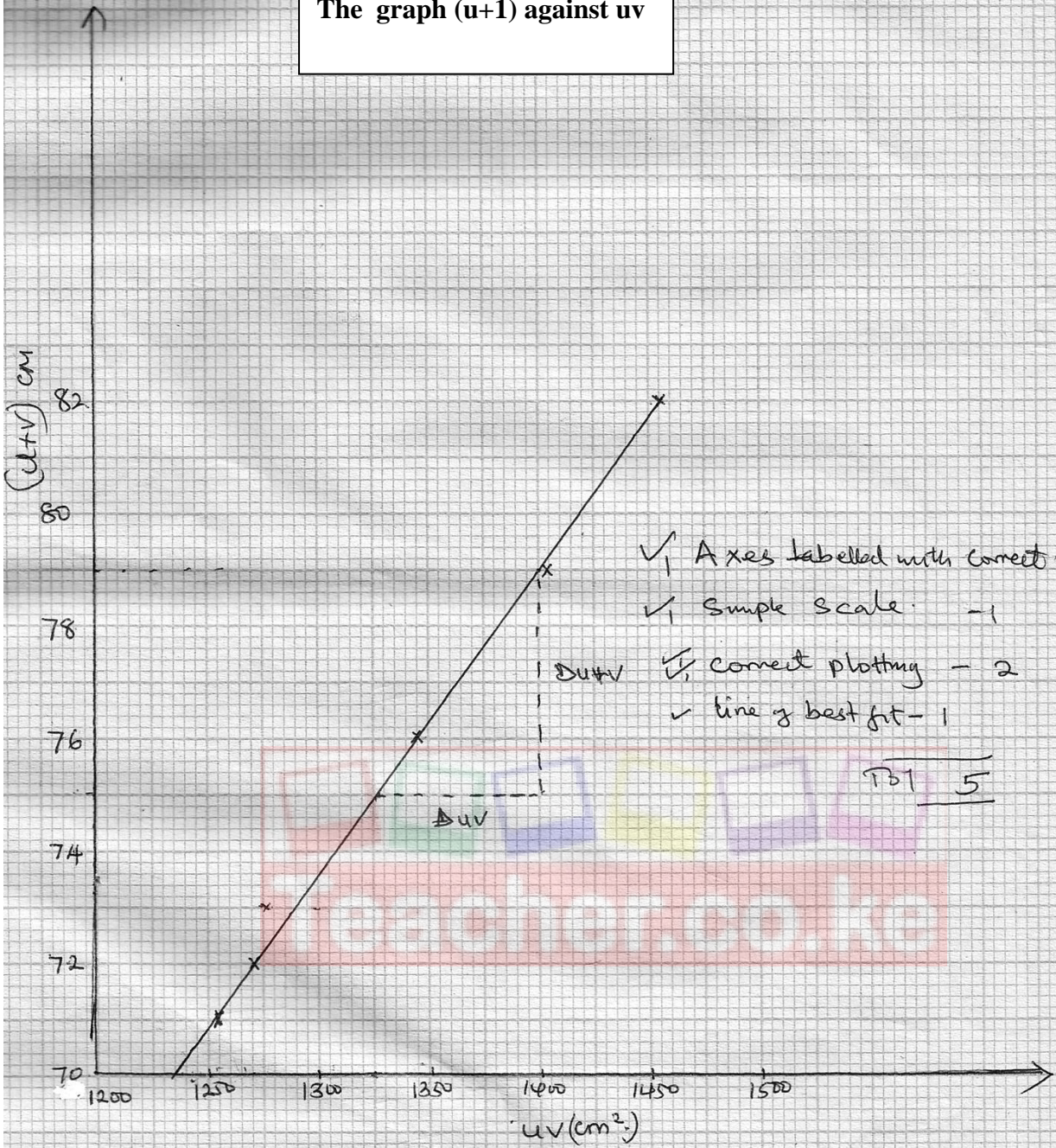
Slope of the graph of u+v against uv is a straight line with a slope of 1/f hence

$1/f = 0.05556\text{cm}^2$

$F = 18\text{cm} \sqrt{1}$

(c)  $R = \frac{4 \times 18\text{cm} \sqrt{1}}{0.05556\text{cm}^{-1}}$  correct substitute  
 $R = 23328\text{cm}^2 \sqrt{1}$  correct answer

The graph  $(u+1)$  against  $uv$



- ✓ Axes labelled with correct units - 1
- ✓ Simple scale - 1
- ✓ Correct plotting - 2
- ✓ line of best fit - 1

7  
5

## Question2

- (i) Average diameter =  $0.35 \pm 0.01 \text{ mm} \sqrt{1}$

L (cm)	L (m)	V (volts)	I (AMP)	R = V/I( $\Omega$ )
20	0.2	0.3	0.20	1.5
30	0.3	0.5	0.20	2.5
40	0.4	0.6	0.20	3.0
50	0.5	0.7	0.20	3.5
60	0.6	0.9	0.20	4.5
70	0.7	1.0	0.20	5.0
80	0.8	1.2	0.20	6.0

$$\pm 0.1 \quad \pm 0.05$$

$$\sqrt{1}\text{mrk} \quad \sqrt{3}\text{mrks} \quad \sqrt{3}\text{mrks} \quad \sqrt{1}\text{mrk} \quad \text{Total} = 8\text{mrks}$$

- (iv) See the graph on the grid provided

- (a) Slope =  $\frac{DR}{Dt \sqrt{1}}$

$$\begin{aligned}
 &= \frac{(3.0 - 1.5)\Omega}{0.4 - 0.2 \text{ M} \sqrt{1}} \\
 &= \frac{1.5\Omega}{0.2\text{M}} \\
 &= 7.5\Omega \text{ M}^{-1}
 \end{aligned}$$

- (b)  $R = R \ell L/A$

$$A = r^2$$

$$= 3.142 \times \frac{0.35}{2} \times \frac{0.35}{2}$$

$$A = 0.09622 \times 10^{-6} \text{ m}^2 \sqrt{1} \text{ for area of cross-section of the wire slope of the graph } \ell/A$$

$$E = \text{slope} \times a \sqrt{1}$$

$$= 7.5 \Omega \text{ m}^{-1} \times 9.622 \times 10^{-9} \text{ m}^2$$

$$= 7.2165 \times 10^{-5} \Omega \text{ M} \sqrt{1} \text{ with correct units}$$



The graph of  $(u+v)$  against  $uv$

