

END TERM 2

232/3
PHYSICS
PAPER 3

MARKING SCHEME

1.d)

Mass m (g)	100	150	200	250	300	350
Time for 20 oscillation t (s)	6.59	8.03	9.60	10.91	11.57	12.56
Period time T (s)	0.3295	0.4015	0.4800	0.5455	0.5785	0.6280
T ² (S ²)	0.1086	0.1612	0.2304	0.2976	0.3347	0.3944

- * For t each correct value $\frac{1}{2}$ mk max 3mks
- * For T all values correct 2mks more than 3 correct
1mk less than three correct 0mk. max 2mks
- * For T² all values correct 1mk max 1mk

f) Gradient = $\frac{\Delta Y}{\Delta X} = \frac{\Delta T^2}{\Delta m} = \frac{0.25-0}{0.225-0} \checkmark^1 = 1.111 \text{ s}^2/\text{kg} \checkmark^1$

g) $y = mx + c$

$$T^2 = \frac{\pi^2}{K} M + 0 \quad = \text{Slope} = \frac{\pi^2}{K}$$

$$K = \frac{\pi^2}{\text{slope}} \checkmark = \frac{\pi^2}{1.11} = 8.972 \text{ N/m} \checkmark$$

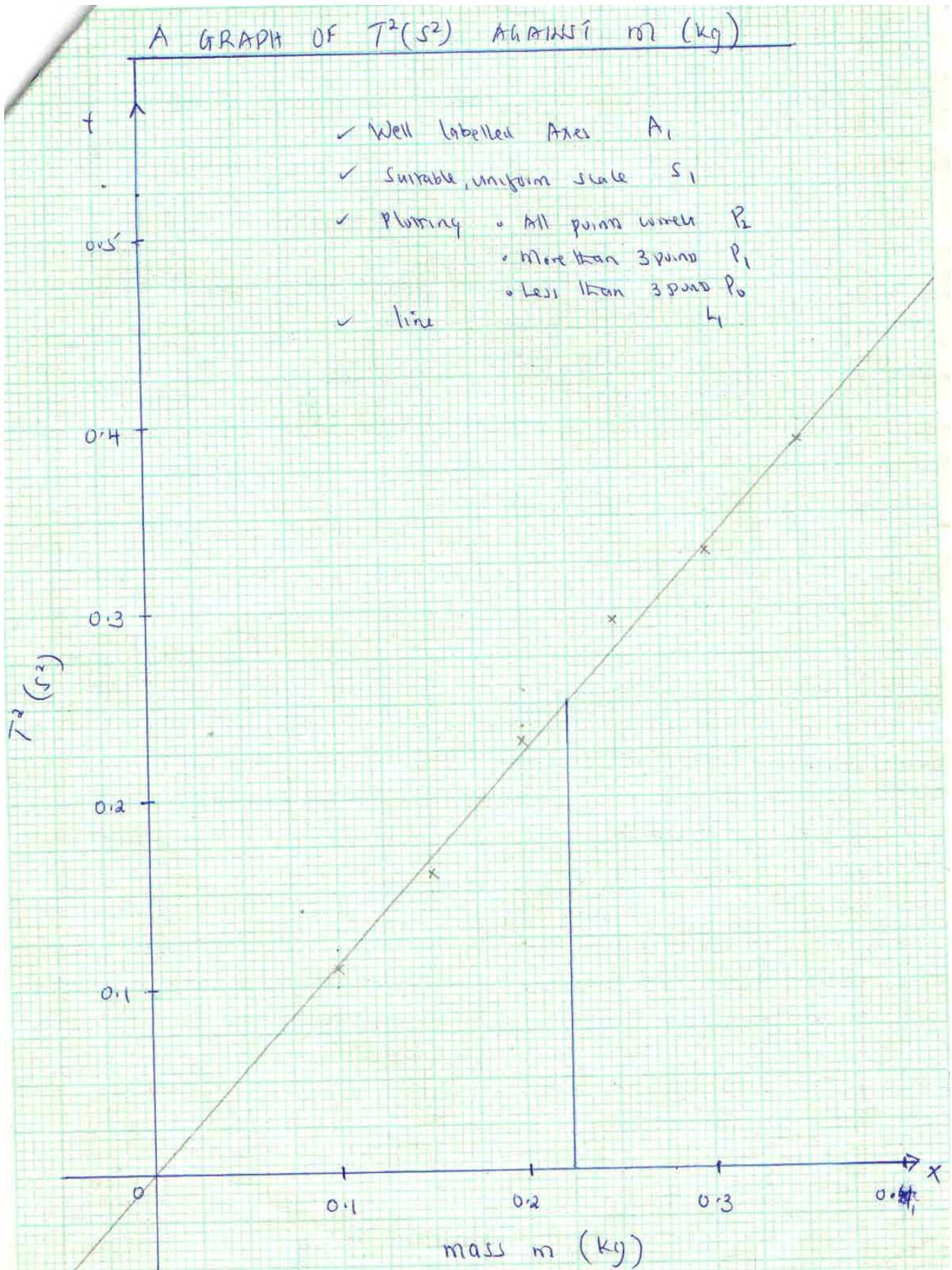
k) Lines P₁ P₂ & P₃ P₄ intersecting at I \checkmark

l) Q P₀ = 10.0cm \checkmark

Q I = 6.6 cm \checkmark

m) $n = \frac{QP_0}{QI} = \frac{10.0}{6.6} = 1.5152 \checkmark$

n) Refractive index \checkmark



QUESTION 2

b) $I = 0\text{A}$ ✓
 $E = 3.0 \pm 0.2\text{V}$ ✓

c)

Length L (cm)	70	50	40	30	20	10	
p.d V (V)	2.4	2.3	2.2	2.1	2.0	1.8	$\pm 0.2\text{v}$
Current I (A)	0.18	0.21	0.25	0.29	0.32	0.38	$\pm 0.01\text{v}$

@½mk
max 6mks

e) Slope $= \frac{\Delta V}{\Delta I} = \frac{(3.0-2.5)\text{V}}{(0-0.15)\text{A}}$ ✓
 $= \frac{0.5}{0.15}$
 $= -3.33\Omega$ ✓

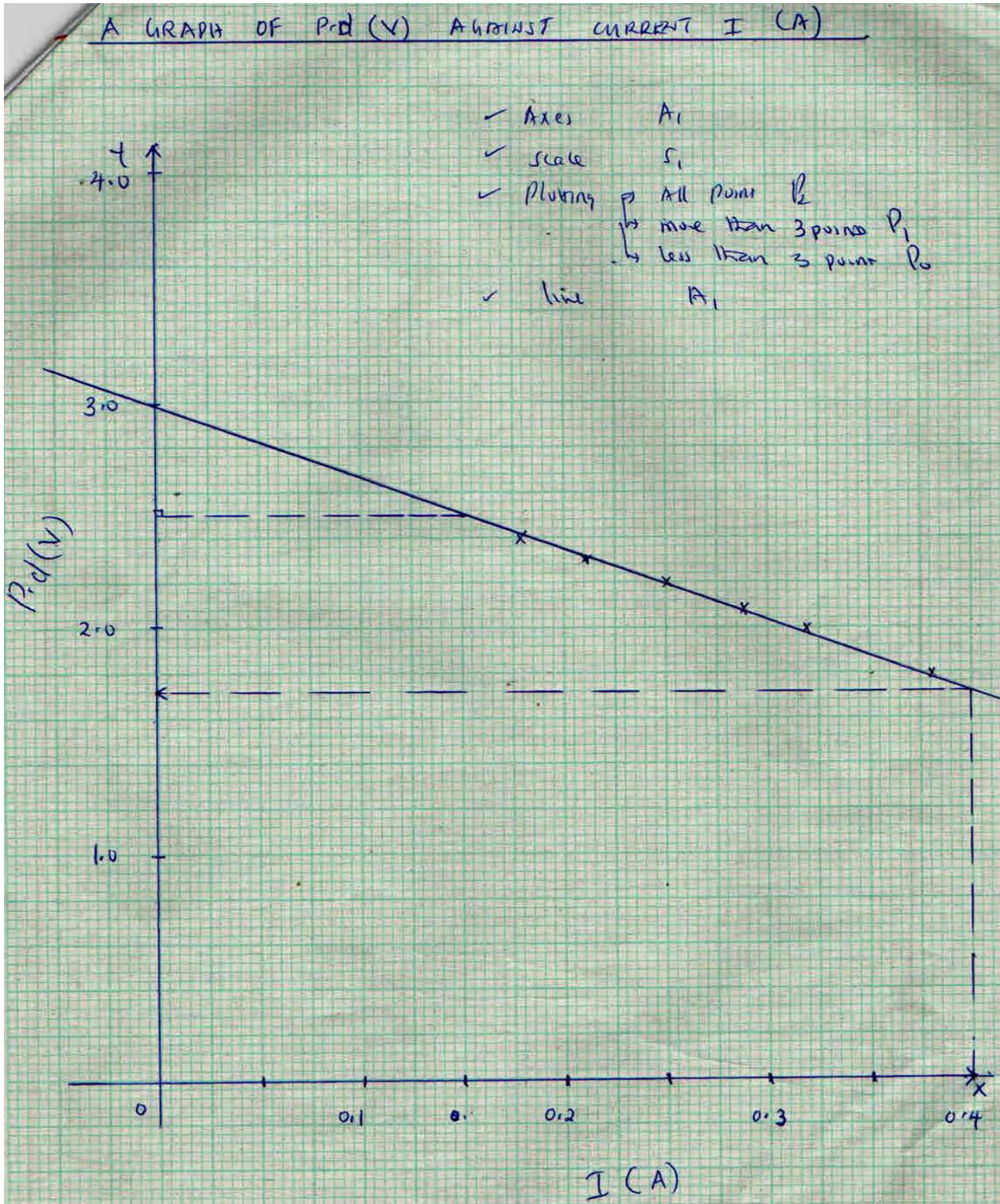
f) $y = m x + c$
 $= -rI + E$

i) E. m. f of the battery = y intercept
 $= 3.0\text{v}$ ✓

since the two cell are in series, the e. m .f of one cell $= \frac{E}{2} = 1.5\text{V}$ ✓

ii) Slope = -r
therefore the internal resistance of the battery = -slope
 $= -(3.33)$ ✓
 $= 3.33\Omega$

e)



Since the cells are in series, the internal resistance of one cell $= \frac{r}{2} = \frac{3.33}{2} = 1.665\Omega \checkmark$

iii) From the graph:

when $I = 0.4A$

$V = 1.75V \checkmark$