

PRESIDENT 'S OFFICE-RALG
IRAMBA DISTRICT COUNCIL
FORM FOUR PRE- NATIONAL EXAMINATION

CODE 031/2A

PHYSICS 2A

ACTUAL PRACTICAL

TIME: 2:30 HOURS

Year: 2023

MARKING SCHEME

QUESTION NO 1

i. Table of result

05 marks

Length "L" (cm)	Time "t" for 20 oscillations (sec)	Period "T" obtained by $\frac{t}{20}$ (sec)	T ² (sec ²)
100	40	2.00	4.00
80	36	1.80	3.24
60	31	1.55	2.40
40	26	1.30	1.69
20	19	0.95	0.90

ii. Given that

02 marks

$$T = 2\pi \sqrt{\frac{l}{g}} \quad \text{squaring both sides, we have}$$

$$T^2 = \frac{4\pi^2 l}{g}$$

iii. Slope = $\frac{\Delta T^2}{\Delta l} = \frac{2.0 - 0.4}{50 - 10} = \frac{1.6}{40} = 0.04 \text{ sec}^2/\text{cm}$

02 marks

Slope = 0.04 sec²/cm

01 mark

Since $T^2 = \frac{4\pi^2 l}{g}$ then taking the coefficient of L as slope, we have

$$\frac{4\pi^2}{g} = slope$$

02 marks

$$\frac{4\pi^2}{g} = 0.04 \text{ sec}^2 / cm$$

01 marks

$$g = \frac{4\pi^2}{0.04 \text{ sec}^2 / cm} = \frac{4 \times 9.8506}{0.04} = 985.06 \text{ cm/sec}^2 = 9.85 \text{ m/s}^2$$

02 mark

Acceleration due to gravity (g) = 9.85m/sec²

01 mark

iv. Sources of errors

☐ Time reaction to start both the bob and the stop watch at once

01mark

☐ Angle variation during displacement

01 mark

We can minimize the above errors by

☐ Making sure that both the bob and the stop watch are started at once

01mark

01 mark

☐ Displace a pendulum gently in a small angle

QUESTION NO 2

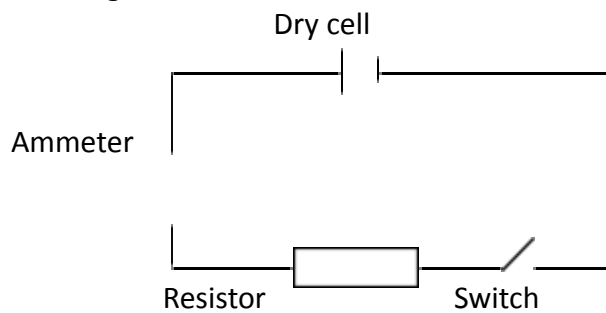
i. Table of result

05 mark

R (Ω)	I (A)	$\frac{1}{I} (A^{-1})$
R_y	0.6	1.7
1	1.0	1.0
3	0.4	2.5
5	0.3	3.3
7	0.2	5.0
9	0.1	10.0
10	0.1	10.0

ii. The diagram for the circuit

02 marks



iii. Slope = $\frac{\Delta \frac{1}{I}}{\Delta R} = \frac{7.5 - 3}{11 - 4} = \frac{4.5}{7} = 0.643 \text{ V}^{-1}$

01 mark

Slope = 0.643 V^{-1}

01 mark

iv. From the graph $R_y = 2\Omega$

01 mark

v. From;

$E = I(R + r)$

01 mark

Divide by I both sides

$\frac{E}{I} = R + r$

then divide by E

$\frac{1}{I} = \frac{1}{E}(R + r)$

$$\frac{1}{I} = \frac{1}{E} \times R + \frac{r}{E}$$

02 mark

Where; Slope = $\frac{1}{E}$

01 mark

$$E = \frac{1}{\text{Slope}} = \frac{1}{0.643} = 1.55V$$

00 $\frac{1}{2}$ mark

Electromotive force (e.m.f) = 1.55V

01 mark

Intercept = $\frac{r}{E}$ but intercept = $0.4A^{-1}$

01 mark

$$r = 0.4 \times E$$

00 $\frac{1}{2}$ mark

$$0.4 \times 1.55 = 0.62\Omega$$

Internal resistance (r) = 0.62Ω

01 mark

vi. Two precautions

☐ Avoid sliding wire it during reading causes heating effect **01 mark**

☐ Switching off the current immediately after taking the reading

01 mark