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 $t/20$ (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	095	0.90

ii. Given that **02 marks**

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

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

iii. Slope = $\frac{\Delta T^2}{\Delta l} = \frac{2.0 - 0.4}{50 - 10} = \frac{1.6}{40} = 0.04\,\sec^2/cm$ **02 marks**

Slope = 0.04 sec^2/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**

$$\frac{4\pi^2}{g} = 0.04\sec^2/cm$$ **01 marks**

g = $$\frac{4\pi^2}{0.04\sec^2/cm} = \frac{4 \times 9.8506}{0.04} = 985.06cm/\sec^2 = 9.85m/s^2$$ **02 mark**

Acceleration due to gravity (g) = 9.85m/sec^2 **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

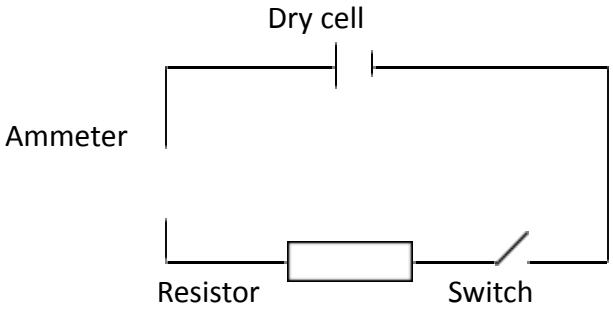
- Making sure that both the bob and the stop watch are started at once **01mark** **01 mark**
- Displace a pendulum gently in a small angle

QUESTION NO 2

i. Table of result **05 mark**

R (Ω)	I (A)	$1/I\,(A^{-1})$
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 = $\frac{\Delta\, 1/I}{\Delta R} = \frac{7.5-3}{11-4} = \frac{4.5}{7} = 0.643$ 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 = $\frac{1}{Slope} = \frac{1}{0.643} = 1.55V$ **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 x E **00 $\frac{1}{2}$ mark**

0.4 x 1.55 = 0.62Ω

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**