THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

131/3C **PHYSICS 3C**

(ACTUAL PRACTICAL C)

(For Both School and Private Candidates)

Time: 3 Hours 20 Minutes **ANSWERS** **Year : 2021**

Instructions

1. This paper consists of three (3) questions.
2. Answer all questions
3. Non-programmable calculators may be used.
4. Communication devices and any unauthorised materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

1. (i) Tabulated results (10 oscillations each):

a (cm)	Time t (s)	T = t/10 (s)	T^2 (s^2)
92	19.2	1.92	3.69
82	18.2	1.82	3.31
72	17.0	1.70	2.89
62	15.8	1.58	2.50
52	14.5	1.45	2.10
42	13.1	1.31	1.72
32	11.5	1.15	1.32

(iii) The relation is $T^2 = (4\pi^2/g)\cdot a$.

So slope = $4\pi^2/g$. From graph, slope ≈ 0.040 s^2/cm = 4.0 s^2/m.

Thus $g = 4\pi^2$ / slope = 39.5 / 4.0 ≈ 9.9 m/s^2.

(iv) Aim: To determine acceleration due to gravity using a simple pendulum.

2. (i) Tabulated values (θ vs t):

t (min)	Temp θ (°C)
0	85
2	81
4	78
6	75
8	72
10	70
12	68
14	66
16	64

18	62
20	60

(ii) Graph of θ against t is smooth cooling curve.

(iii) Slope at θ = 70 °C:

Take points at 68 °C (12 min) and 72 °C (8 min).

$\Delta\theta/\Delta t = (72 - 68)/(8 - 12) = 4/(-4) = -1$ °C/min = –0.017 °C/s.

(iv) Rate of heat loss at 70 °C:

Equation: $dQ/dt = mwCw \cdot (d\theta/dt)$.

m = 0.150 kg (since 150 ml water).

Cw = 4200 J/kgK.

$d\theta/dt$ = –0.017 K/s.

$dQ/dt = 0.150 \times 4200 \times (-0.017) \approx -11$ J/s.

So heat loss rate ≈ 11 J/s at 70 °C.

3. (i) Tabulated readings:

l (cm)	V (V)
10	0.40
20	0.80
30	1.20
40	1.60
50	2.00

(ii) Graph of V against l is a straight line through origin.

(iii) Slope = $\Delta V/\Delta l = 2.0/50 = 0.040$ V/cm = 4.0 V/m.

(iv) The slope represents the potential gradient along the wire.

(v) For V = 2 V, l = V/slope = 2.0 / 0.040 = 50 cm.