THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

031/2   **PHYSICS 2**
ALTERNATIVE TO PRACTICAL
(For Both School and Private Candidates)

TIME: 2½ Hours   *Tuesday morning 16/10/2007*
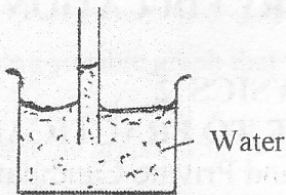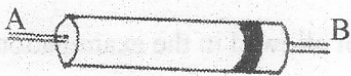

Instructions

1.   This paper consists of **five (5)** questions.

2.   Answer **all** questions.

3.   Marks for each question or part thereof are indicated beside the question.

4.   Cellular phones are **not** allowed in the examination room.

5.   Electronic calculators are **not** allowed in the examination room.

6.   Write your **Examination Number** on every page of your answer booklet(s).

This paper consists of 4 printed pages.

1. Fill the gaps with the correct responses.

	Name of device	Sketch	(i) Physical effect/principle (ii) Application (uses)
(a)	Tall jar cylinder with holes		(i) (ii) **(2 marks)**
(b)		Water	(i) (ii) **(2 marks)**
(c)	Hypsometer		(i) (ii) **(2 marks)**
(d)	Periscope		(i) (ii) **(2 marks)**
(e)		A B	(i) (ii) **(2 marks)**

2. Given below is the data of an experiment carried out with the aim of determining acceleration due to gravity, g; by use of a simple pendulum.

Length ofpendum, (cm)	Time for 50 oscillations (s)	Periodic time, T (s)	T^2 (s^2)
100	99		
80	90		
60	78		
40	65		
20	45		

   (a) Complete the table by obtaining the values of T and T^2. **(2½ marks)**

   (b) Plot a graph of (vertical axis) against T^2 (horizontal axis). **(5 marks)**

S4S

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(c)   Determine the slope of the graph.   **(1 mark)**

(d)   Use the slope to find g given that $T = 2\pi\sqrt{\dfrac{\ell}{g}}$.   **(1 mark)**

(e)   Mention one precaution you would take in this experiment to avoid or minimize errors?   **(½ mark)**

3.   The data below were collected during the experiment to determine the electromotive force E and internal resistance r of a cell.

RESISTANCE (R) (Ω)	2	3	4	5
CURRENT (I) (A)	0.18	0.16	0.14	0.12
$\dfrac{1}{\text{CURRENT}}$ $\dfrac{1}{I}$ (A^{-1})				

(a)   Complete the above table for the values of $\dfrac{1}{I}$.   **(2 marks)**

(b)   Plot the graph of $\dfrac{1}{I}$ against R.   **(5½ marks)**

(c)   Determine the slope "S" and the intercept x on the $\dfrac{1}{I}$ axis.

                    (1½ marks)

(d)   Determine the value of E and r given that $E = \dfrac{1}{\text{slope}}$ and $\dfrac{r}{E} = x$.

                    (1 mark)

4.   The following values for "u" and "v" were obtained experimentally using a convex lens.

Object distance u (cm)	25.10	30.20	39.80	59.90	100.20
Image distance v (cm)	100.00	60.00	40.00	30.00	25.00
Magnification, $m = \dfrac{v}{u}$					

(a)   Complete the table.   **(2½ marks)**

(b)   Plot graph of v against m (magnification $m = \dfrac{v}{u}$).   **(5½ marks)**

(c)   Determine the slope of the graph.   **(1 mark)**

(d)   Determine v-intercept of the graph.   **(1 mark)**

5.   When a counter was placed near a radioactive source of Beta-particle (β-particle), the following rates of emission were obtained at the time shown.

| Count rate/minute | 298.00 | 162.00 | 90.00 | 51.00 | 29.00 |
| Time (minutes) | 0.00 | 07.00 | 14.00 | 21.00 | 28.00 |

(a)   Plot a suitable graph that will help you to find the half-life of the source.
                                                            (5½ marks)

(b)   From the graph, what is the half-life of the source?   **(1 mark)**

(c)   How can a strong magnet be used to identify the charge of the source in this experiment?   **(2½ marks)**

(d)   Mention other **two (2)** ways you would use to test radioactive sources.
                                                            (1 mark)