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

PHYSICS 2
ALTERNATIVE TO PRACTICAL
(For both School and Private Candidates)

2:30 Hours **Wednesday, 13th October 2010 a.m.**

Instructions

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

Answer **all** questions.

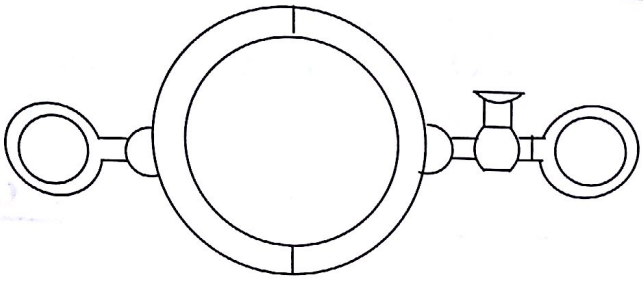
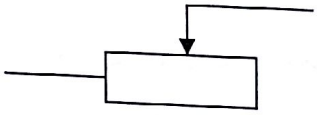
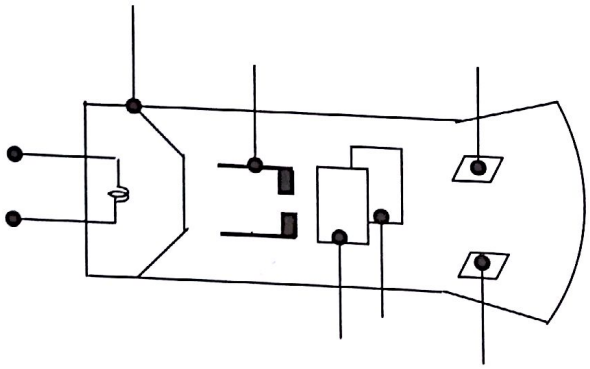
Marks for each question or part thereof are indicated beside the question.

Calculators and cellular phones are **not** allowed in the examination room.

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

This paper consists of 5 printed pages.

1. Fill in the gaps with the correct responses:

Name of device	Sketch	(i) Physical effect/princi (ii) Application
(a)		(i) (ii)
(b) Hope's Apparatus		(i) (ii)
(c) Resonance Experiment tube		(i) (ii)
(d)		(i) (ii)
(e)		(i) (ii)

(10 marks)

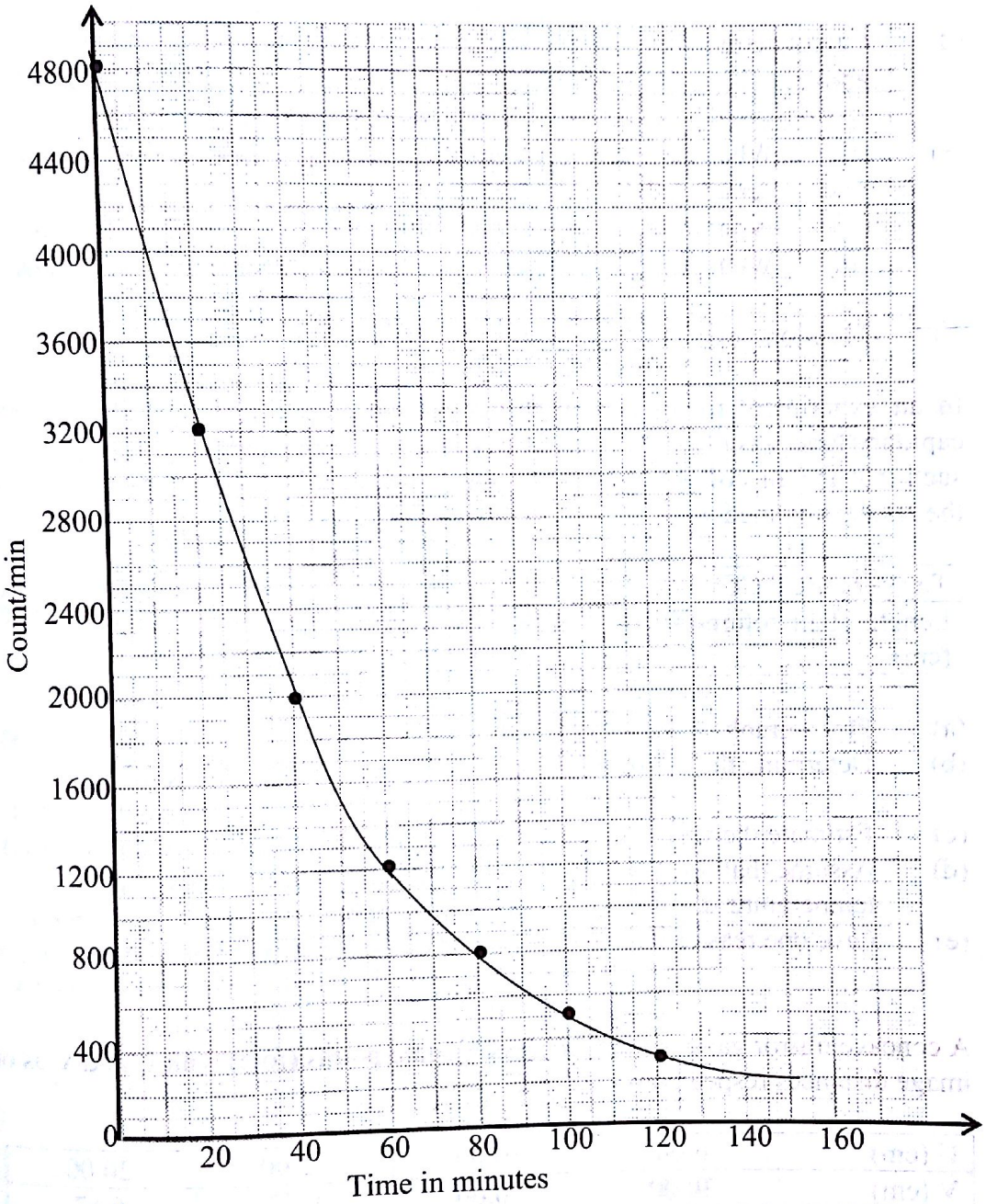
The graph given below is from the results of a certain experiment. Use the graph to answer the following questions.

GRAPH OF COUNT RATE AGAINST TIME

Scale:

Vertical Axis; 1cm: 200 Count/min

Horizontal Axis; 1cm: 10 min



(a) Determine the time when:
(i) The count rate was 4400 counts/min. **(1 mark)**
(ii) The count rate was 2200 counts/min. **(1 mark)**

(b) Calculate the time between the two count rates (a) above. **(1 mark)**

(c) Determine the time when
(i) the count rate was 2800 counts/min. **(1 mark)**
(ii) the count rate was 1400 counts/min. **(1 mark)**

(d) Calculate the time that elapsed between the count rates you have found in (c) above. **(1 mark)**

(e) (i) What is the name given to the times you have calculated in (b) and (d) above? **(1 mark)**
(ii) What is the significance of this time? **(1 mark)**
(iii) What experiment is represented by the graph? **(1 mark)**

(f) Mention one use of radioactive material decay. **(1 mark)**

3. In an experiment to study the change of the air column L with temperature θ, capillary tube was placed vertically in a tall beaker of water with the open end at the such that the air column was surrounded by water. The water was steadily heated a the results obtained were as follows:

Temperature θ (°C)	0	20	40	60	80
Length of air column L (cm)	10.00	10.80	11.50	12.40	13.30

(a) Plot a graph of L against θ. **(5 marks)**
(b) Determine the length of the air column at the temperature of 30°C. **(1 mark)**
(c) Estimate the length of the air column at 30°C. **(2 marks)**
(d) Assume that the gas behaves in accordance with the gas laws. At what temperature should the volume of gas become zero? **(1 mark)**
(e) Give one reason why the volume of the gas does not become zero in practice. **(1 mark)**

4. A concave mirror gave the following conjugate points (foci) with U and V as object a image distances respectively.

U (cm)	6.00	10.00	12.00	20.00
V (cm)	30.00	10.00	8.57	6.67
U^{-1} (cm^{-1})				
V^{-1} (cm^{-1})				

(a) Complete the table by filling in the corresponding values of U^{-1} and V^{-1} respectively. **(2 marks)**

(b) Plot a graph of V^{-1} against U^{-1}. Extrapolate your graph to include X and Y intercepts. **(5 marks)**

(c) Use your graph to
(i) read off the value of Y-intercept.
(ii) read off the value of X-intercept.
(iii) calculate the sum of the X- and Y - intercepts.
(iv) find the reciprocal of your answer in c (iii) above. **(2 marks)**

(d) What is the significance of the value in (c) (iv) above? **(1 mark)**

An experiment was conducted to determine the relationship between the frequency and the length of the air column using the resonance tube placed in the vessel nearly filled with water. The following results were obtained:

Frequency (f) of fork (Hz)	200	256	288	320	384	512
Length (L) of air column (m)	1.00	0.781	0.695	0.625	0.521	0.391
$\frac{1}{L}(m^{-1})$						

(a) Calculate the reciprocal of L, for each value of L in the table. **(2 marks)**

(b) Plot a graph of f against $\frac{1}{L}$ **(5 marks)**

(c) Determine the formula for the relationship between the frequency of vibration and the length of the air column. **(2 marks)**

(d) What is the source of error or difficult in this experiment? **(1 mark)**