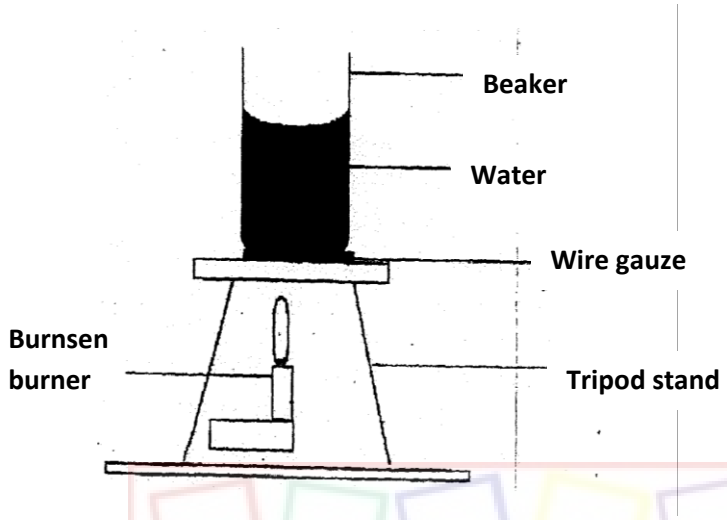
PHYSICS 232/3
MARKING SCHEME
QUESTION ONE

You are providd with the following;
- A 40m1 glass beaker
- A Bunsen burner
- A thermometer
- A stop Watch
- A tripod stand and a measuring cylinder 100ml
- A wire gauze
- A source of heat

Set up the apparatus as shown in the diagram below.



Measure 100cm^3 of water and pour it into the beaker. Take the initial temperature of the water.

T_0 27°c (1 mark)

Now heat the water to a temperate of 90°C. Switch off the gas tap and place a thermometer into the beaker and start the stop watch when the temperature is 650C. Take the temperatur T°C of water every two minutes.

Record your results in the table below.

Time (t) (min)	2	4	6	8	10	12	14
Temperature (T) ^{0}C	60	57	54	52	50	48	47
$(T - T_0)^0$	33	30	27	25	23	21	20
Log $(T - T_o)$	1.5185	1.4771	1.4314	1.3979	1.3617	1.3222	1.3010

(i) Plot graph of Log (T — To) against Time (t) (5 marks)

(ii) Find the value K of log (T — T_o) when t =0 (2 n

K =1. 56 shown the graph

Determine the antilog of K. (2 marks)

Antilog K= 36.31

(iii) Calculate the temperature of the surrounding T_R using the expression

Antilog K 65 - T_R (3 marks)

36.31 =65-T_R

T_R=65-36.31

T_R = 28.69°C

QUESITON TWO

This question has two parts A and B. answer both parts

PART A

You are provided with the following:

- A meter rule
- Two identical l00g masses
- About 200m1 of liquid L in 250m1 beaker
- Three pieces of thread, each about half metre long
- Stand with clamps
- Tissue paper

Proceed as fol'ows:

(a) Using a stand and one piece of thread, suspend the metre rule in air such that it balancçs horizontally.

Record the position of the centre of gravity.

G.=500 mm

NOTE: The metre rule should remain suspended at this point through out the experiment.

(b) Set up the apparatus as in figure 2 below.

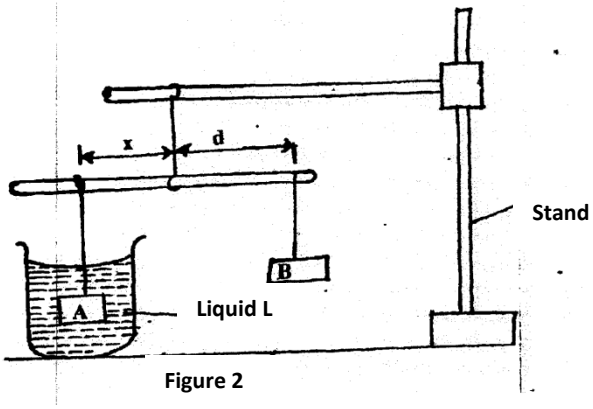


Figure 2

Suspend the sums A at a distance x = 50mm. Adjust the position of mass B until it balances mass A immersed in liquid L.

Record the ditance d, of mass B from the pivot.

Repeat the saiie process for other values of x in table 2 below and complete the table.

x (mm)	50 5	100 10	150 15	200 20	250 25	300 30
d (cm)	4.4	9.2	13.6	18.2	23.0	27.4

Graph

(d) Determine the slope , S of the graph

Gradient = $\frac{DY}{DS} = \frac{14-0}{15-C}$

= 0.9333 (2 marks)

(e) Given S = $\frac{F}{W}$, where F is the apparent weight of objects A in the liquid L and W is W the actual weight of A, find: -

i) The va1ue $\frac{F}{}$ (2 marks)

0.9333 = F/1

F = 09333N

(ii) The up thrust, U

U=1-0933 U=W-F

U=0.0667N (3 marks)

PART B

You are provided with the following:

- A concave mirror with holder
- A screen
- A meter rule
- A candle
- A match box (to be shared)

Proceed as follows:

(f) Set p the apparatus as in figure 3 below.

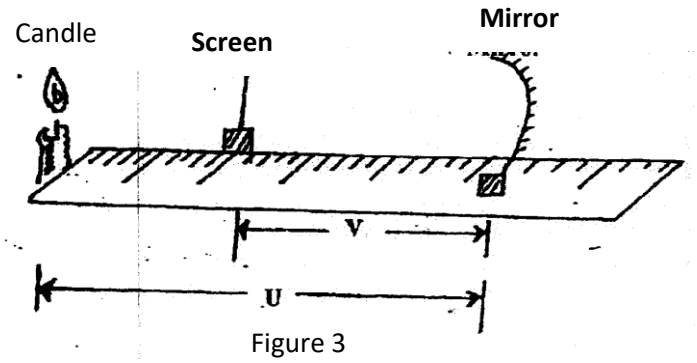


Figure 3

(g) Put th object at a distance u = 30cm from the mirror. Adjust the position of the screen until a sharp image is formed on the screen. Record the distance V.

(h) Repeat procedure (g) above for the distance u=40cm and record the new distance V. complete the table below

U(cm)	V(cm)	M=V/U	(m+1)
30	22.5	1.333	2.333
40	30.1	1.329	2.329

(i) Given, $f = \frac{V}{(m+1)}$ calculate the values off hence determine the average value f_{av} (3mks)

$f_1 = \frac{22.5}{2.333} = 9.657cm$

$f_2 = \frac{30.1}{2.329} = 12.924cm$

$f_{av} = \frac{f1+f2}{2} = \frac{9.657+12.924}{2}$

=11.2905cm