Name:..... **Index No.:** .....

Adm No:……..

Candidate's Signature: .....

Date: .....

232/3
PHYSICS
Paper 3
PRACTICAL
TERM 1, 2017
Time: 2¼ hours

MOI HIGH SCHOOL - KABARAK

FORM FOUR END TERM EXAMINATION

PHYSICS

Paper 3

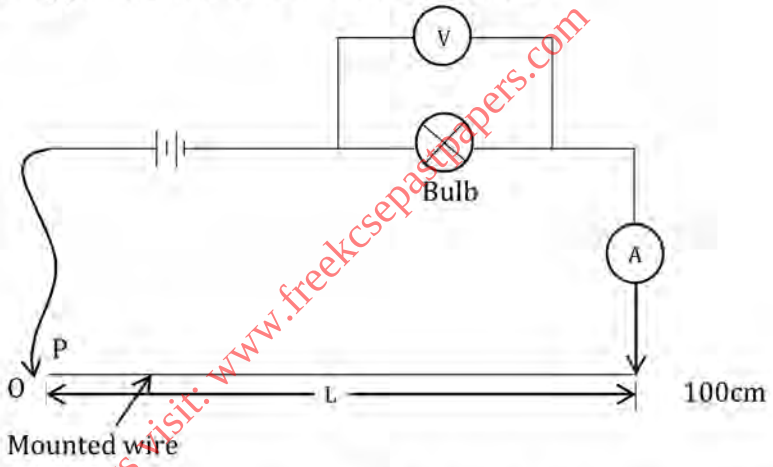
Instructions to Candidates

- *Write your name and index number in the spaces provided above.*
- *Sign and write the date of the examination paper.*
- *Answer **ALL** the questions in the spaces provided in the question paper.*
- *ALL working **MUST** be clearly shown where necessary.*
- *Mathematical tables and silent electronic calculators may be used.*
- *Candidates should check the paper to ascertain that all the pages are printed as indicated and that no questions are missing.*
- *Take density of water 1g/cm^3.*

1. You are provided with the following apparatus:

- An ammeter (0 – 3A)
- A voltmeter (0 – 3V)
- Two dry cells and cell holders
- A mounted resistance wire on a meter rule.
- Seven connecting wires with crocodile clips at both ends.
- A bulb
- A jockey or crocodile clip
- Micrometer screw gauge (to be shared)

(a) (i) Connect the apparatus as shown in the circuit below.



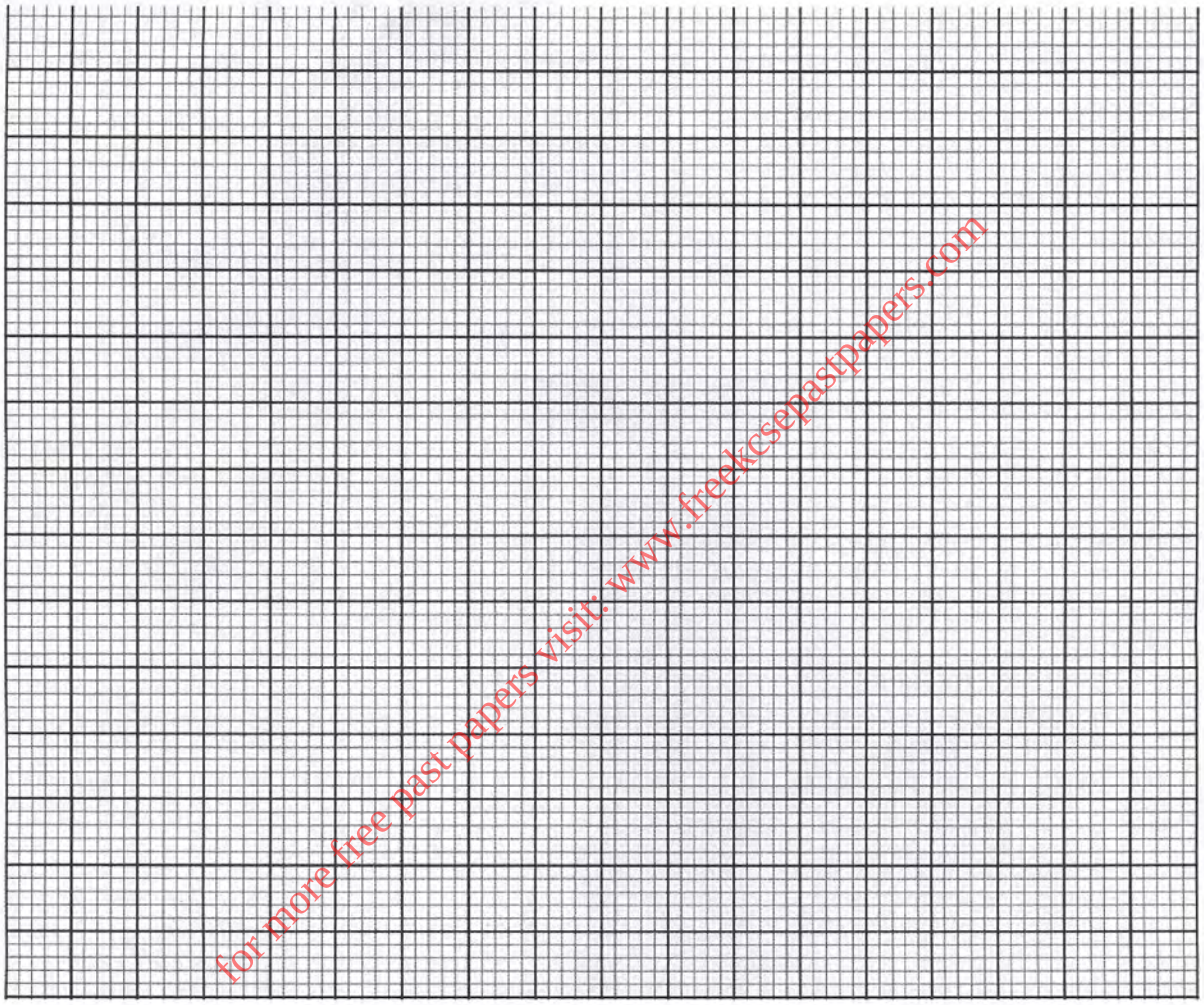
(ii) With the crocodile clip at P (L = 100cm) take the voltmeter and ammeter readings. Record V and I in the table below. Repeat for other values of L shown in the table.

Length L (cm)	100	75	50	25	0
p.d V (V)					
Current I (A)					

Complete the table

(5 marks)

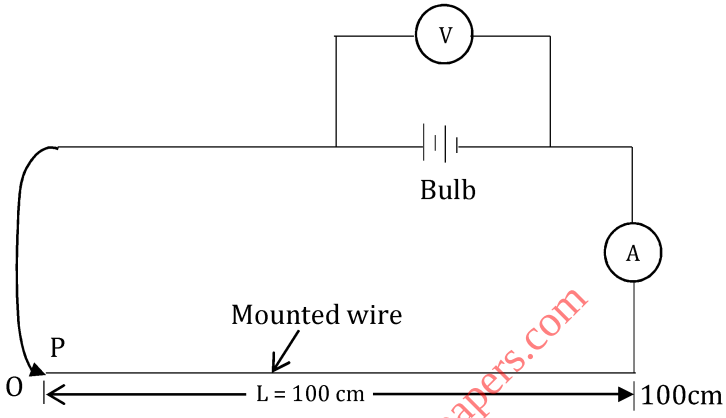
(iii) Plot a graph of current I (y – axis) against the p.d. V (x – axis).
(5 marks)



(iv) Determine the slope of the graph when the p.d. V = 1.5v. (3 marks)

(v) State and explain how the physical property represented by the slope of the graph changes with the current. (2 marks)

(b) Use the apparatus provided to connect the circuit shown below.



(i) Record the current I and the p.d (V) (2 marks)

I = ...

V = ...

(ii) Using the micrometer screw gauge measure the diameter d of the wire. (1 mark)

d = ...

(iii) Calculate the quantity

$$= 0.785 \frac{V}{I} \frac{d^2}{L}$$

and give its units, where **L** and **d** are in **SI units.** (2 marks)

2. PART A: You are provided with the following apparatus:-

- One complete clamp stand.
- One mass labelled X.
- One mass labelled S
- One metre rule
- Three pieces of thread
- Water in 100ml beaker labelled W.
- A liquid in 100ml beaker labelled L
- Some tissue paper
- A piece of cellotape/masking tape.
- Vernier calipers (to be shared).

Proceed as follows:

(a) Suspend the metre rule as shown in figure 1 below. Adjust the position of the thread until the metre rule balances at it's centre of gravity. Record the mark on the metre rule where it balances.

Balancing mark .....cm. (1 mark)

This position should be maintained throughout the experiment. Use the celotape provided to fix the thread to the metre rule at this position.

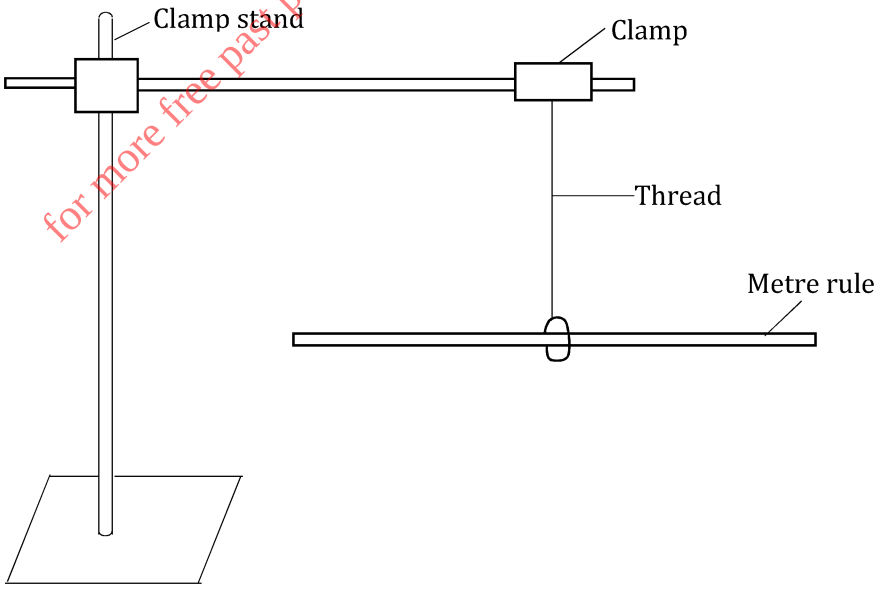
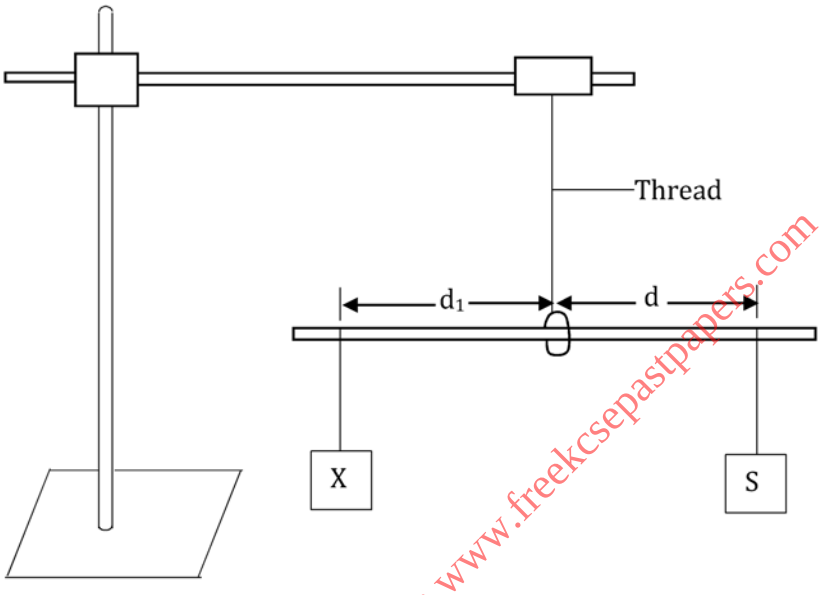


Figure 1.

(b) Hang the mass labelled S at d = 20cm and the mass labelled X on the opposite side as shown in figure 2 below.

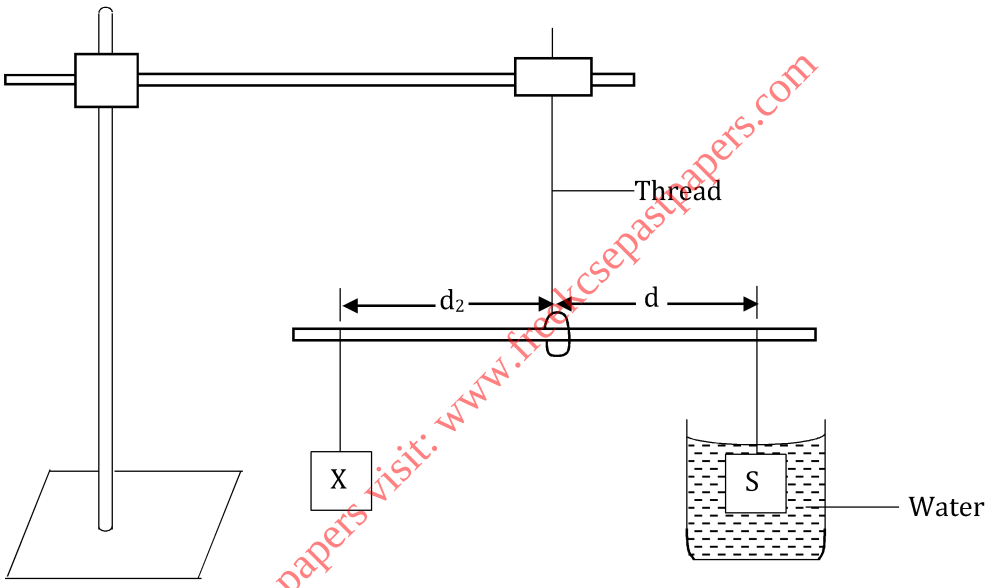


Adjust the position of X until the system balances in the air horizontally and record the distance d_1. (i.e. the distance of X when S is in air) in the table. Repeat for values of d = 25, 30, 35 and 40cm, each time measuring the respective distance d_1 and tabulating your results in the table provided.

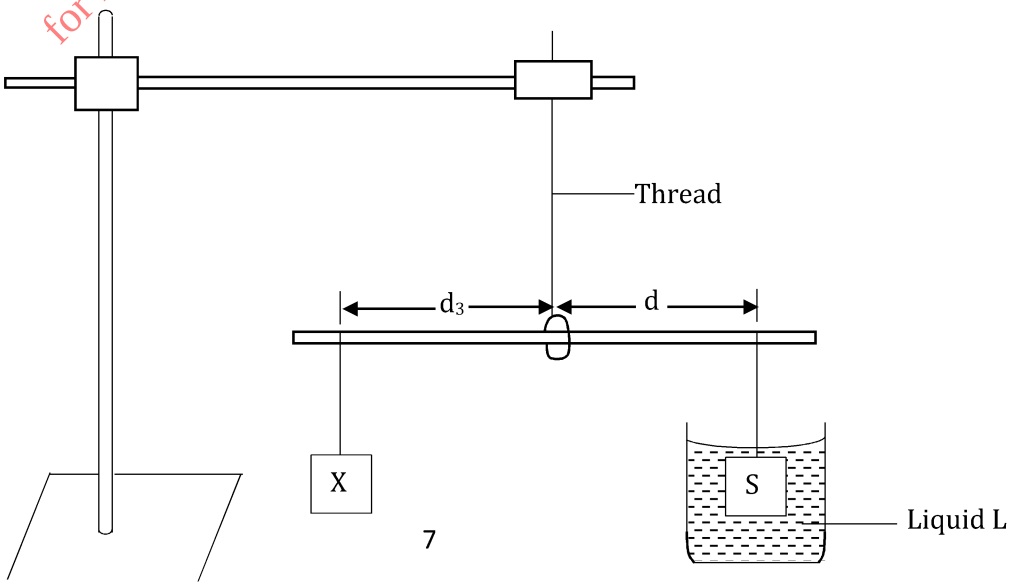
Table (5 marks)

d (cm)	Distance d_1 is the distance of X when S is in air.	Distance d_2 is the distance of X when S is in Water.	Distance d_3 is the distanced of X when S is in Liquid L.	$d_1 - d_2$ (cm)	$d_1 - d_3$ (cm)
20					
25					
30					
35					
40					

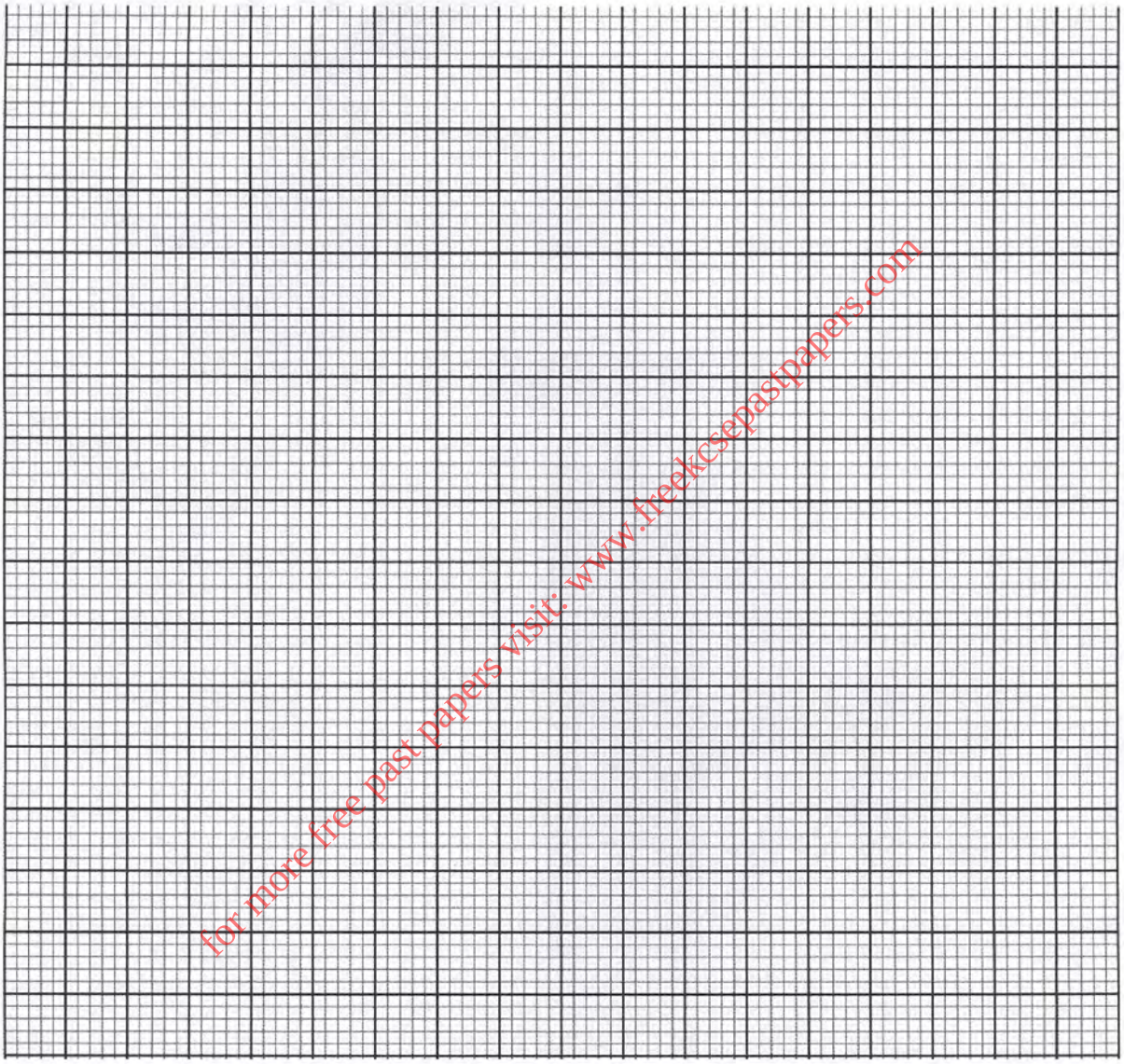
(c) With the mass S completely immersed in water, adjust the distance d_2 of mass X when d = 20cm, until the set up balances horizontally without the mass S touching the sides or bottom of the beaker. Record the value for d_2 when d = 20cm in the table provided. Repeat for values of d = 25, 30, 35 and 40cm, each time measuring the respective distance d_2 and tabulating the results. Determine the values of $d_1 - d_2$ for each pair and completing the table.



(d) Wipe the mass S dry using the tissue paper provided. Repeat the procedure in (c) this time with mass S completely immersed in liquid L. Record the respective distances d_3 of mass X when mass S is in liquid L. Determine the values of $d_1 - d_3$ for each pair and complete the table.



(i) Plot a graph of $(d_1 - d_3)$cm against $(d_1 - d_2)$cm. (4 marks)



(ii) Determine the gradient G of your graph. (3 marks)

(e) (i) Using the Vernier calipers provided measure the height and diameter of the mass X. (4 marks)

Height = ...

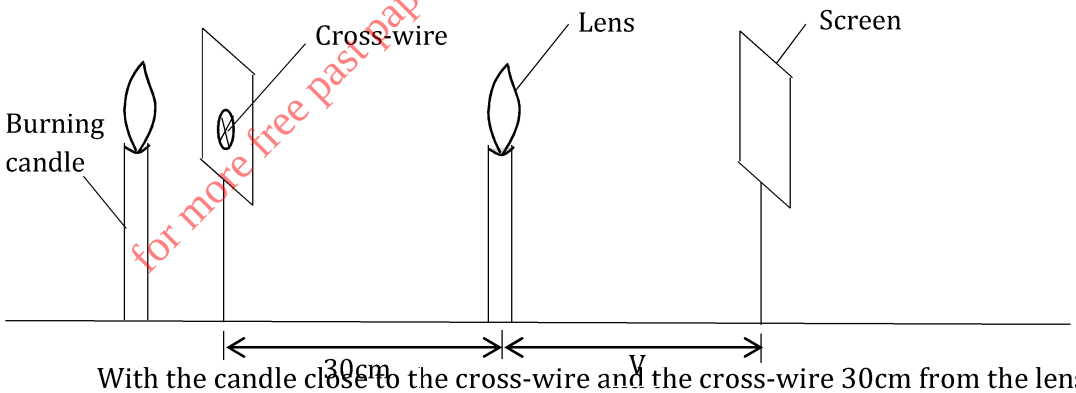
Diameter = ...

(ii) Determine the volume V of the mass X.

PART B: You are provided with the following:

- One lens labelled A
- One lens holder
- One white screen
- One white screen with a cross-wire
- One candle
- A metre rule

(f) Arrange the candle, cross-wire lends and screen as shown in the figure below. (Ensure that the candle, the cross-wire and the centre of the lens are in the same horizontal line)



With the candle close to the cross-wire and the cross-wire 30cm from the lens. Adjust the position of the screen until a sharp image of the cross-wire is seen on the screen.

(i) Measure the distance V : V = ...cm (1 mark)

(ii) From the formula $f = \frac{30V}{30+V}$ determine the value of f. (2 marks)