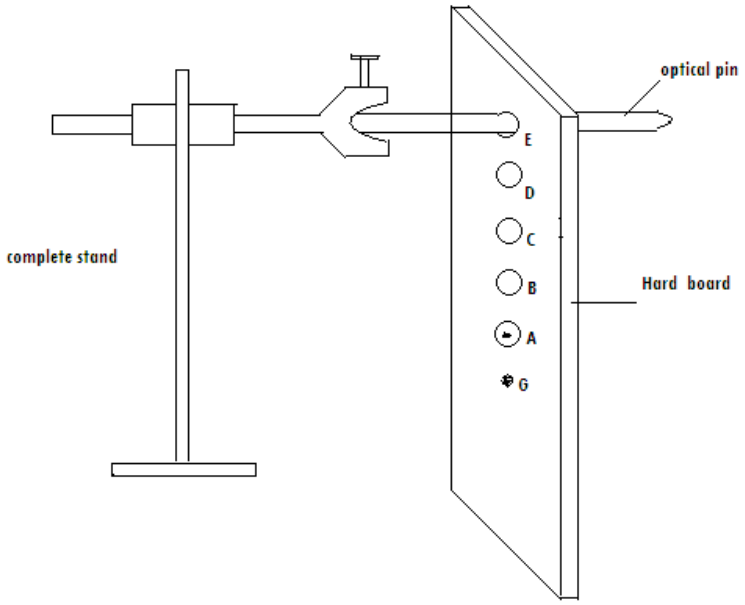
1. You have been provided with the following apparatus
   - A wooden plank
   - A stop watch
   - Optical pin
   - Retort stand
   - Wooden pegs

(a) Proceed as follows.

i) Set the apparatus as shown in the fig below with the optical pin being at the position A which is 4 cm from the centre of gravity of the wooden plank. (Marked G)



ii) Displace the strip through an angle of about 15° from its rest position and release it to swing to and fro (oscillate). Measure the time t for 10 oscillations of the wooden plank. Record your observations.

b) Repeat steps (ii) with the pin through the holes B, C, D and E of lengths l = 6 cm, 8cm, 10cm, and 12cm respectively from the centre of gravity of the wooden plank and tabulate your results in table.

ii)

Hole	A	B		C	D	E
Distance	0.04	0.06		0.08	0.10	0.12
Time for 10 osc						
Period T						
T^2S^2						
T^2 l						
L 2 x 10^{-4}						

c). Plot a graph of T^2S^2 against $l m$ (5mks KRC)

d). Determine the value of the slope S of your graph. (3mks KRC)

e). The equation of the line is represented by $T.l = \frac{4\pi^2 l^2}{R} + \frac{4\pi^2 k^2}{R}$

i. Find the value of the constant g given Л= 3.142. (2mks KRC)

R

ii. Find the value of the intercept C of your graph and hence find the value of K. (3mks KRC)

2. You have been provided with the following apparatus.

- Resistor R
- Cell size D new
- Cell holder
- Two potential meters marked W and X.

a) Proceed as follows.

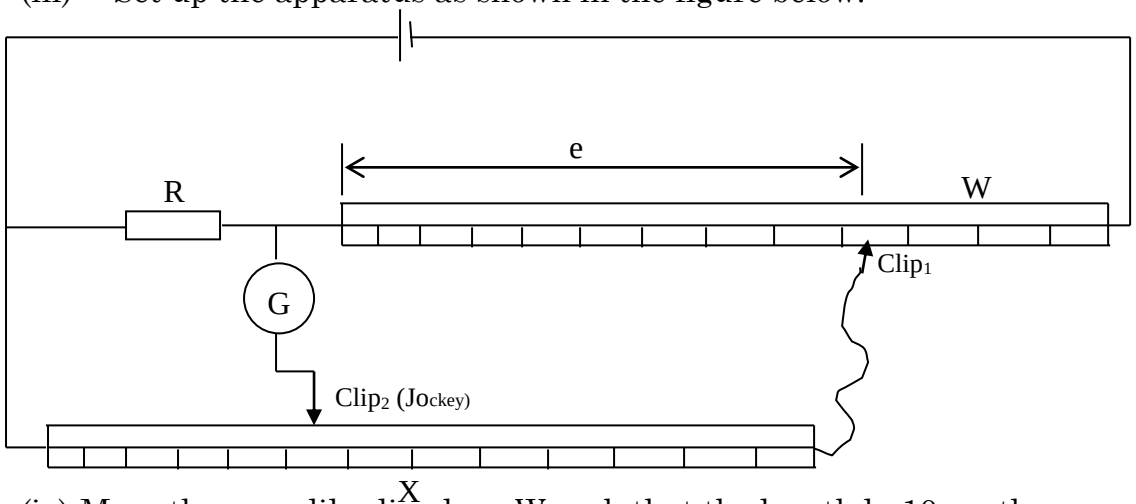
(i) Measure and record the diameter of wire W

D = m^2

(ii) Use the information to calculate the cross-sectional area of the wire. (A)

A= m^2

(iii) Set up the apparatus as shown in the figure below.



(iv) Move the crocodile clip along W such that the length l =10cm, then move the jockey to obtain a balance point along the wire X. Record the length l and the value of the balance point along wire X.

b) Repeat steps (iii) for values of l =20cm, 30, 40, 50, 70 and 80cm and complete the table. (6mks KRC)

c)

L cm	10.0	20.0	30.0	40.0	50.0	70.0	80.0
L M							
$\frac{1}{L}M^2$							

c) Plot a graph of l cm against 1/ l (cm-1) (5mks KRC)

d) From the graph find the slope S of your graph. (3mks KRC)

S =

e) From the graph state the value of $\frac{1}{l}$ (cm-1) When l =0 (1mk KRC)

f) Given that $\ell = \frac{100R}{JL} - \frac{R}{J}$ find the value of J when R =10Ω (2mks KRC)