

INSTRUCTIONS.

- The paper consists of 2 questions.
  - Answer both questions in the spaces provided
  - record your observations as shown soon as they are made.
- Record may be in pencil provided it is sufficiently neat to be intelligible
- Non-programmable silent electronic calculators and K.N.E.C Mathematical tables may be used.

1. You are provided with the following:

- A spring with a pointer
- A half-metre rule
- A micrometer screw gauge (to be shared)
- A stand and a clamp
- A vernier caliper
- 5 masses of 50g each.

Proceed as follow:

i) Count the number (N) of complete turns of the spring

N = \_\_\_\_\_ (1mk)

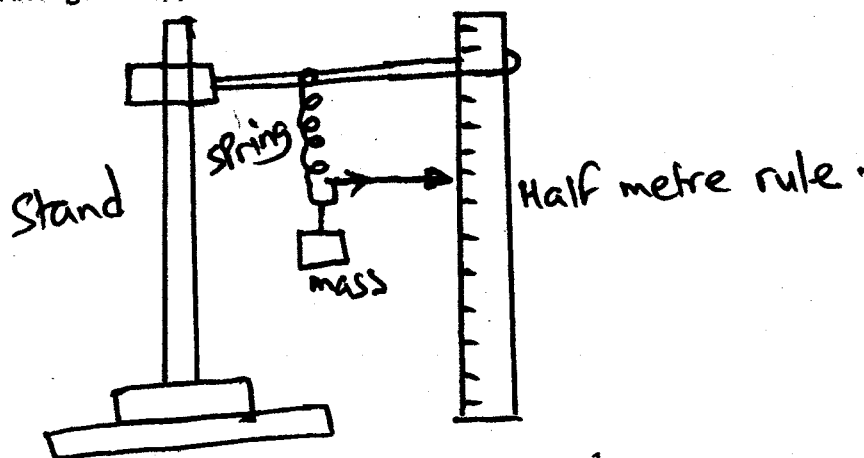
ii) Measure the outer diameter D of the spring using the vernier calipers and record

D = \_\_\_\_\_ (1mk)

iii) Measure the diameter (d) of the wire from which the spring is made and record the value in metres.

d = \_\_\_\_\_ (1mk)

iv) Arrange the apparatus as shown in the diagram below.



v) Record the initial reading on the rule ( $L_0$ ) when no load is hung on the spring  
 $L_0 =$  \_\_\_\_\_ (1mk)

vi) Now hung a 50g mass on the spring and record the reading L. Repeat this for 100g, 150g, 200g, 250g upto 400g and record the observation in the table below.

Mass on spring (ing)	Reading on rule (L)	Extension ( $L - L_0$ )
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50

100

150

200

250

300

350

400

vii) On the grid provided plot a graph of extension (y – axis) against load. (8mks)

viii) Determine the slope of the graph and state the units. (5mks)

(2mks)

ix) Calculate the quantity n where  $n = \frac{8NDg}{d^4}$  taking  $g = 10N/kg$  (1mk)

2. You are provided with the following apparatus.
- A milliammeter
  - A Voltmeter
  - A wire mounted on a millimeter scale
  - A switch
  - A new dry cell
  - A micrometer screw gauge
  - Connecting wires

Proceed as follows

- a) Measure the diameter  $d$  of the mounted wire at three different points.

$D_1 =$

$d_2 =$

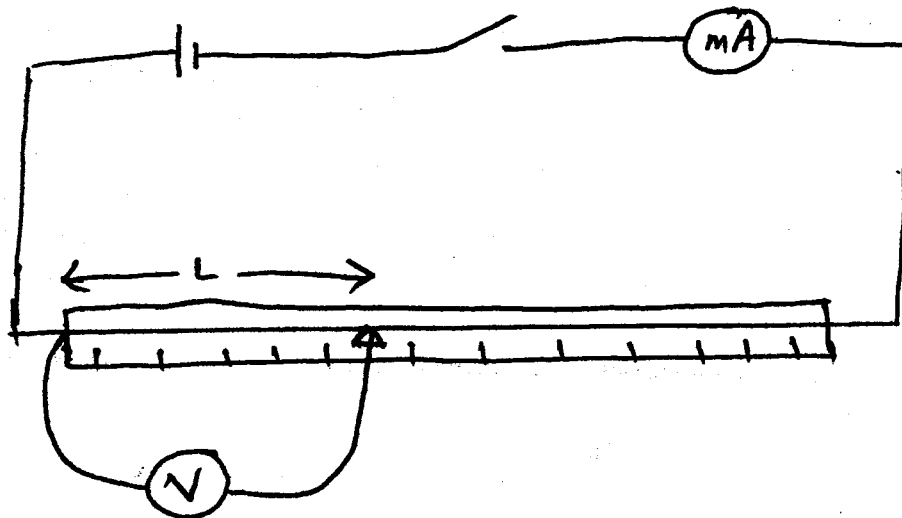
$d_3 =$

Average  $d =$

mm

(1mk)

- b) Set up the apparatus as below



Close the switch and tap the mounted wire with crocodile clip as shown in the circuit. Ensure that both meters show positive deflections, open the switch.

