Session 6

Q1, 9702/o/n/34/21

You may not need to use all of the materials provided.

1. In this experiment you will investigate an electrical circuit.
   (a)
     (i)
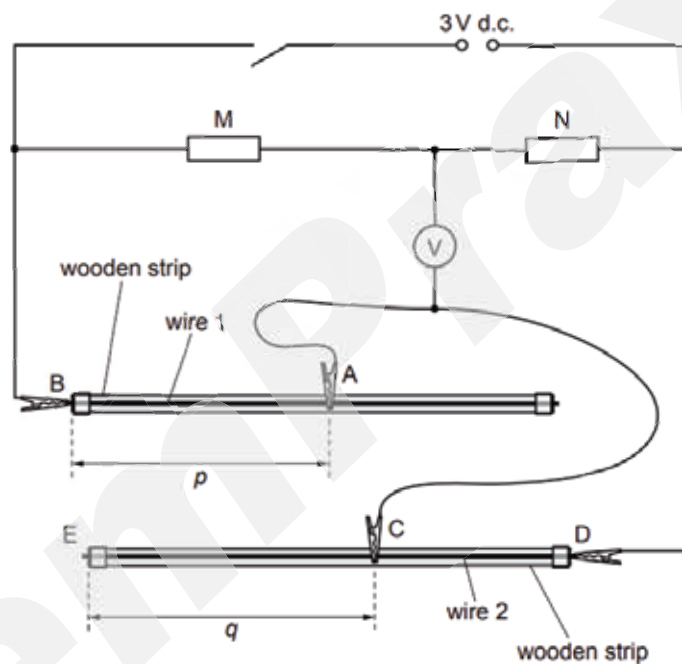   - Assemble the circuit shown in Fig. 1.1.

Fig. 1.1

- A, B, C and D are crocodile clips.

  Connect A approximately half-way along wire 1.

- Measure and record the distance p between B and A, as shown in Fig. 1.1.

  p = ... cm

- Close the switch.
- Test your circuit by placing C at end E of wire 2. The voltmeter reading should be non-zero. Record the voltmeter reading.

voltmeter reading = ... V

- Open the switch.

[1]

(ii)
- Close the switch.
- Adjust the position of C on wire 2 until the voltmeter reading is as close as possible to zero.
- The distance between C and E is q, as shown in Fig. 1.1.

Measure and record q.

q = ... cm
- Open the switch.

[1]

(b) Move A to a new position on wire 1. Measure and record p and repeat (a)(ii).
Repeat until you have six sets of values for p and q.

Record your results in a table. Include values of 1 q and p q in your table.

[10]

(c)
  (i) Plot a graph of 1/q on the y-axis against p/q on the x-axis.
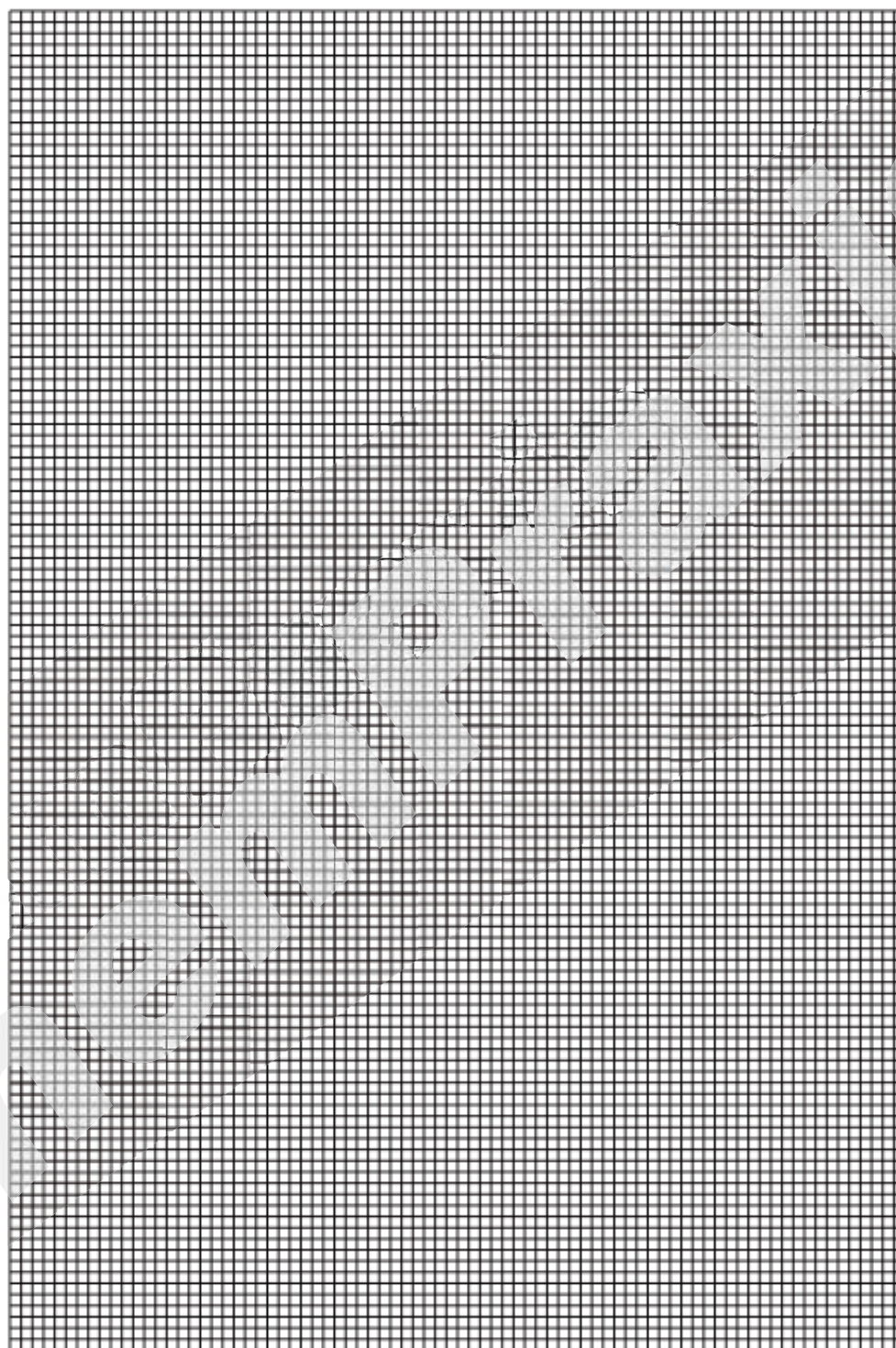
[3]

  (ii) Draw the straight line of best fit.

[1]

  (iii)   Determine the gradient and y-intercept of this line.

gradient = ...

y-intercept = ...

[2]

(d) It is suggested that the quantities p and q are related by the equation

$$\frac{1}{q} = a\left(\frac{p}{q}\right) + b$$

where a and b are constants.

Use your answers in (c)(iii) to determine the values of a and b.

Give appropriate units.

a = ...

b = ...
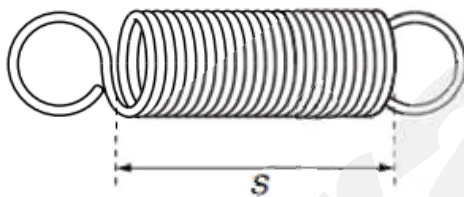
[2]

[Total: 20]

Q2, 9702/33/O/N/18

You may not need to use all of the materials provided.
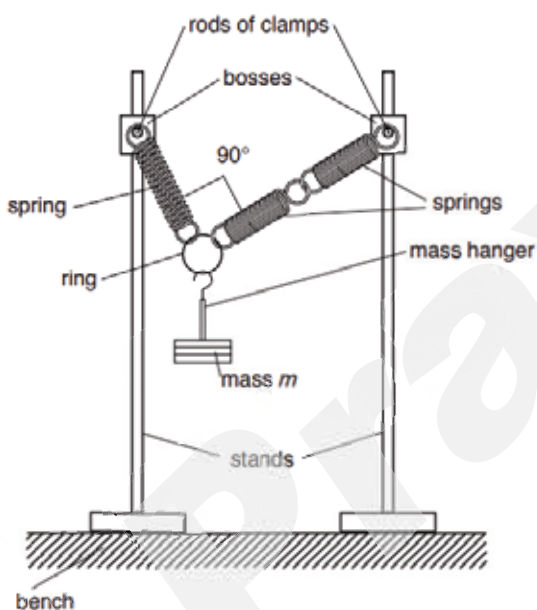
2. In this experiment, you will investigate the equilibrium of a system of three identical springs.
   (a) You have been provided with three springs attached to a ring.

   Measure and record the unstretched length S of the coiled section of one of the springs, as shown in Fig. 2.1.

$$S = \text{...}[1]$$

(b)
(i)
- Set up the apparatus as shown in Fig. 2.2.

Fig. 2.2

- The total mass m of the mass hanger and the slotted masses should be 0.300kg.
- Adjust the position of the bosses so that the centres of the rods of the clamps are at the same height above the bench.
- Change the separation of the stands until the angle between the springs is 90°