SENIOR THREE HOLIDAY WORK

1 (a) (i) Define **moment of a force. (2 mark)**

(ii) State the **principle of moments. (2 mark)**

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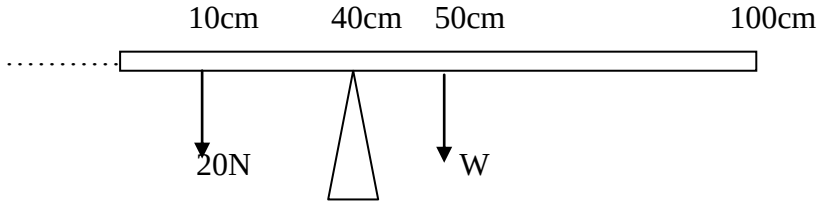
(b) A uniform metre rule is pivoted at the 40 cm mark. The metre rule is in equilibrium under its weight W and a 20 N force acting at the 10 cm mark. Calculate W.



(2 marks)

(a) State **Hooke's law of elasticity**. (01 mark)

(b) Different loads, w, are applied to the end of an elastic wire and the corresponding extension, e, of the wire recorded.

(i) Sketch a labelled graph of e against w. (03 marks)

(ii) Describe briefly the features of the graph in (b) (i). (02 marks)

(c) A spring of natural length 5.0×10^{-2} m extends by 2.0×10^{-3} m when a force of 1.8 N acts on it.
Calculate the extension when a force of 10N is applied to the spring.

(d) Describe an experiment to demonstrate the existence of surface tension (2marks)

2. (a) State Newton's laws of motion. (03 marks)

(b) A block of mass 50 kg is pulled from rest along a horizontal surface by a rope tied to one face of the block as shown in Figure 1.

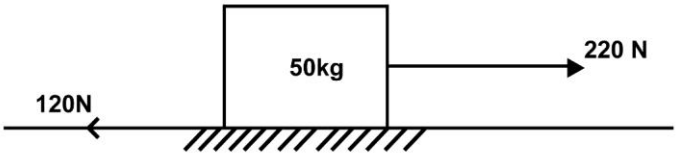


Fig 1

The tension in the rope is 220 N. The frictional force between the block and the horizontal surface is 120 N.

(i) Find the acceleration of the block. (03 marks)

(ii) Calculate the distance moved by the block in 4.0 s. (02 marks)

(iii) What is the reaction of the surface on the block? (02marks)

(iv) Compare the work done by the tension in the rope during the 4.0 s interval with kinetic energy gained. (06 marks)

3. (a) What is meant by **pressure**? (01 mark)

(b) (i) Explain why one feels more pain when pricked with a needle than when pricked with a nail. (05 marks)

(ii) State the **assumption made**. (01 mark)

(C) Calculate the pressure exerted on the ground by a box of mass 10 kg when corresponding area of contact is 2 m^2 (03 marks)