Answer **all** the questions in the space provided.

1 **(a)** **(i)** State the principle of moments.

……

……

……[1]

(ii) Fig. 1.1 shows an arrangement used to demonstrate the principle of moments.

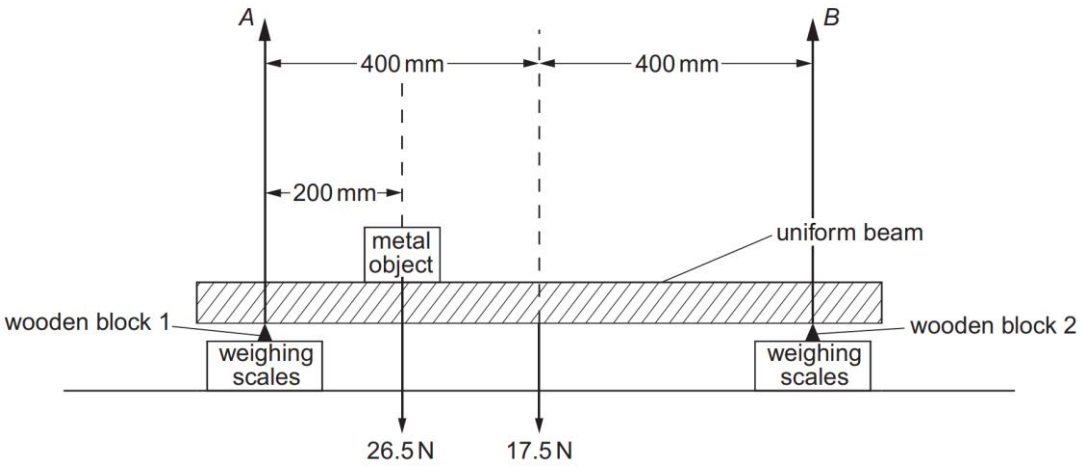

Fig. 1.1

A uniform beam is supported on the edges of two triangular shaped wooden blocks placed on two weighing scales. The weight of the beam is 17.5 N and the distance between the wooden blocks is 800 mm. A metal object of weight 26.5 N is placed 200 mm from one of the blocks. The blocks exert upward forces *A* and *B* on the beam.

Calculate the force *B*.

B = …… N [2]

(iii) State the magnitude of the sum of the two forces *A* and *B* and explain your answer.

……

……

……[2]

(iv) Describe what happens to the forces *A* and *B* as the metal object is gradually moved to the centre of the beam.

……

……

……

……[2]

(b) Fig. 1.2 shows a girl supported by two elastic ropes. She is in equilibrium. Her weight is 392 N.

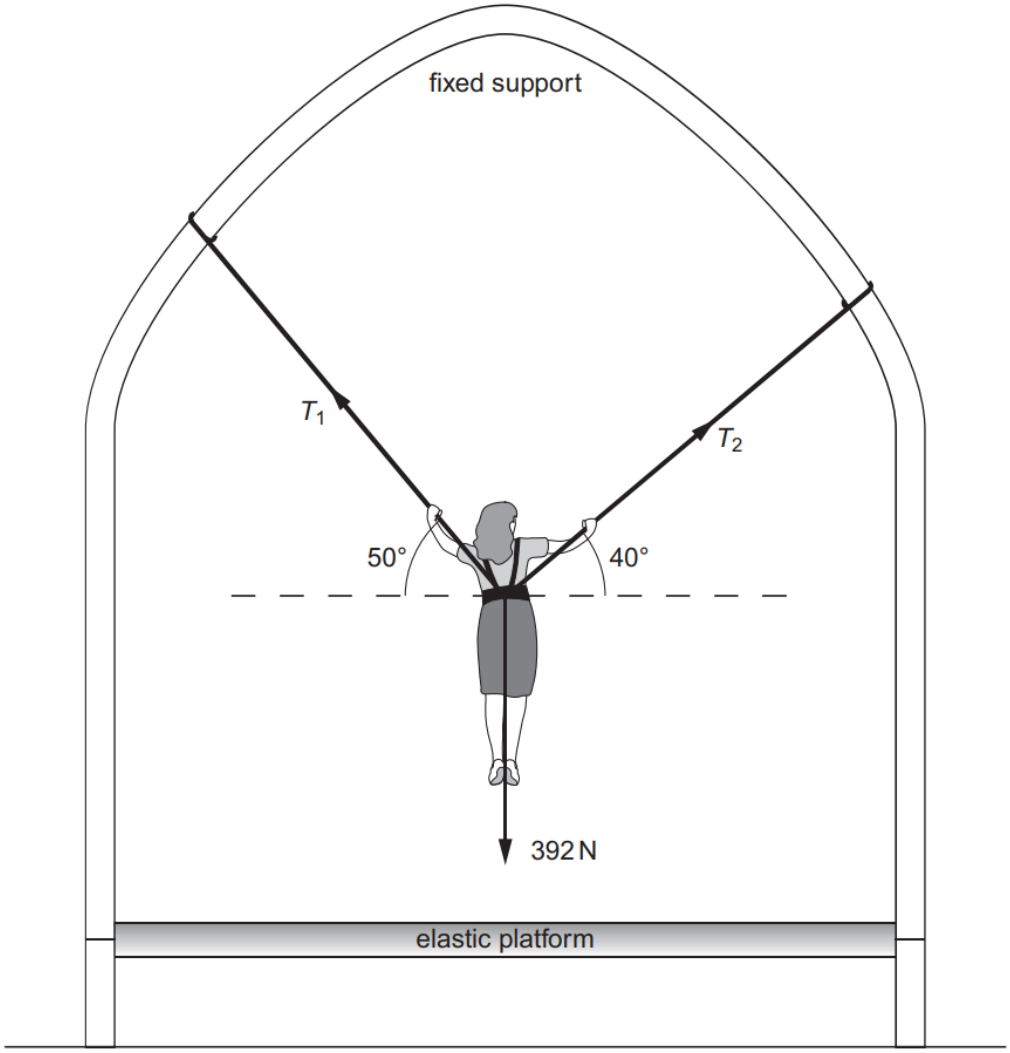

Fig. 1.2

Determine the tensions T_1 and T_2 in the two ropes.

tension T_1 = …….…. N