3   (a) Define the moment of a force about a point.

....

....

....

.... [2]

(b) A person of weight 720 N stands on a uniform beam of length 3.8 m and mass 42 kg. The beam rests on a pivot at a distance of 0.80 m from one end and is in equilibrium.

(i) Draw a sketch of the arrangement, marking relevant distances and forces.

[2]

(ii) Calculate the distance of the person from the pivot.

distance = ... m [2]

(iii) Calculate the magnitude of the upwards force applied by the pivot on the beam.

force = ... N [1]

(c) A support is placed under the beam in **(b)** at the end that is furthest from the person.

The person walks from the position calculated in **(b)(ii)** towards the pivot, then over the pivot and continues towards the support.

Describe qualitatively how the magnitude of the upwards force applied by the pivot on the beam changes as the person walks:

(i) towards the pivot

....

....

.... [1]

(ii) over the pivot and further towards the support.

....

....

.... [1]

[Total: 9]