3 **(a)** Define the *moment of a force*.

.....

..... [1]

(b) Fig. 3.1 shows a 9.0 kg block held still in an athlete's hand. The athlete's arm is bent at the elbow, which acts as a pivot. The athlete contracts his bicep muscle to keep his arm and hand in horizontal equilibrium.

The weight of the arm and hand is 8.0 N.

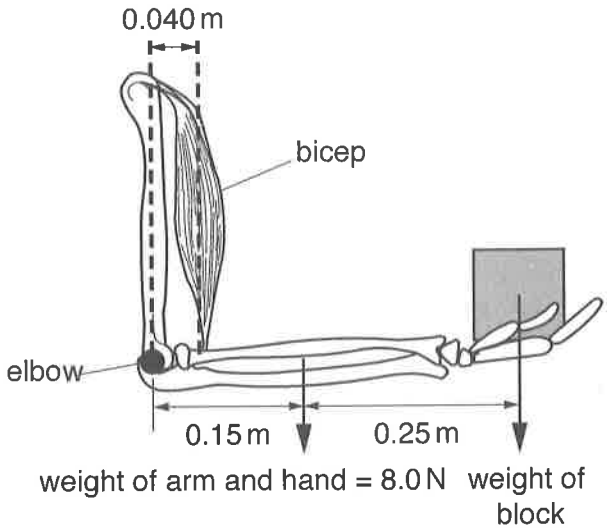

Fig. 3.1

(i) State the conditions necessary for the arm to be in equilibrium.

.....

.....

..... [2]

(ii) Calculate the vertical force the bicep must provide to keep the arm, hand and block in horizontal equilibrium.

force = ... N [3]

[Total: 6]

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