

- 2 A uniform metal rod AB of mass 1.5 kg and length 0.50 m is freely pivoted at A as shown in Fig. 2.1. The end B is suspended by a light spring. The other end of the spring is supported at X. When the rod is at rest, it makes an angle of  $30^\circ$  with the horizontal. The angle between the rod and the spring is  $90^\circ$ .

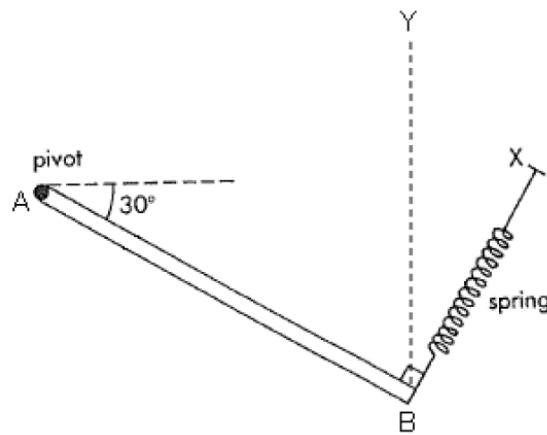


Fig. 2.1

- (a) Draw and label the forces acting on the metal rod AB in Fig. 2.1. The force  $F_A$  acting at the end A of the rod by the pivot can be represented by one force. [2]
- (b) Show that the tension in the spring is 6.4 N.

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- (c) Determine the magnitude and the direction of the force acting at the end A of the rod by the pivot.

magnitude = \_\_\_\_\_ N

direction = \_\_\_\_\_.

[4]

- (d) The top end of the spring is moved to a new position so that the direction of the force acting on the end A of the rod by the pivot is vertically upwards.

Without changing the position of the rod,

- (i) draw a cross 'x' and label the new position of this end of the spring as 'Z' on Fig 2.1 [1]  
(ii) state the magnitude of this force.

magnitude = \_\_\_\_\_ N

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1  
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[Total: 10]