

(5)

(a) the work done against friction as P moves from A to B ,

(b) the speed of P at B . (4)

(Total 7 marks)

Q2



Find

- (a) the times when P is instantaneously at rest,

- (b) the greatest speed of P in the interval $0 \leq t \leq 4$ (5)

- (c) the total distance travelled by P in the interval $0 \leq t \leq 4$ (5)





(Total 13 marks)

Q3



4.

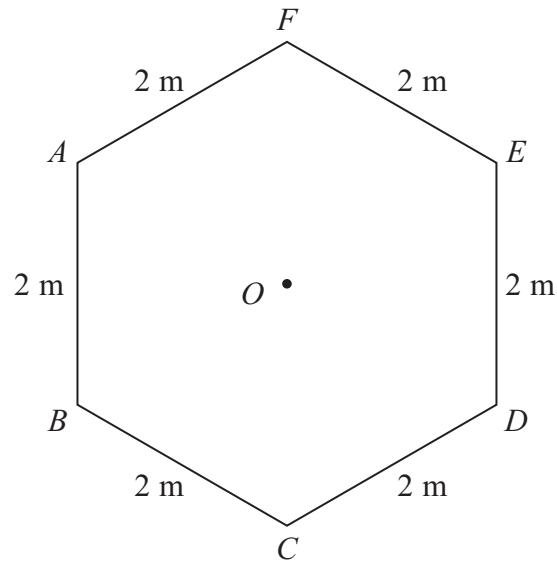


Figure 1

The uniform lamina $ABCDEF$ is a regular hexagon with centre O and sides of length 2 m, as shown in Figure 1.

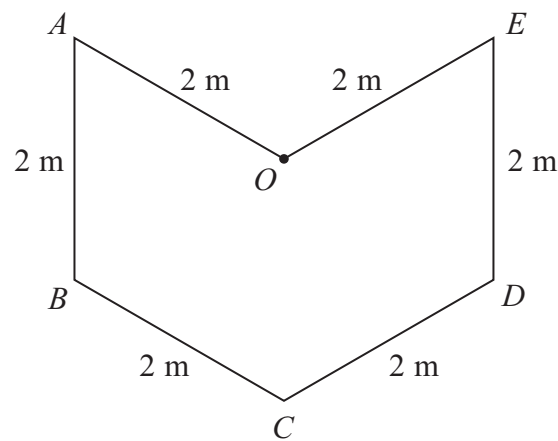


Figure 2

The triangles OAF and OEF are removed to form the uniform lamina $OABCDE$, shown in Figure 2.

- (a) Find the distance of the centre of mass of $OABCDE$ from O . (5)

The lamina $OABCDE$ is freely suspended from E and hangs in equilibrium.

- (b) Find the size of the angle between EO and the downward vertical. (6)





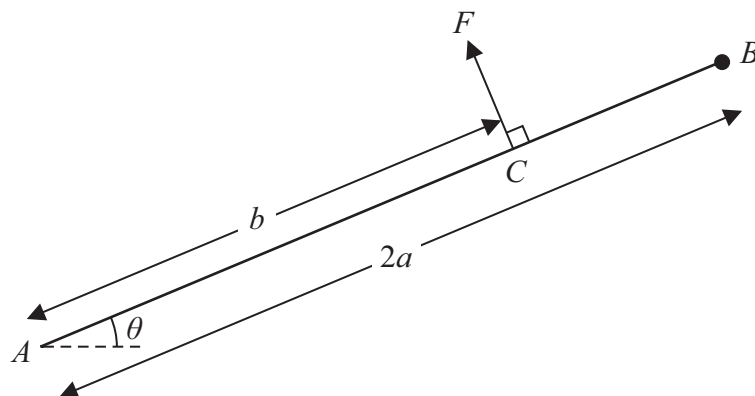
Question 4 continued



(Total 11 marks)

Q4





A uniform rod AB , of mass m and length $2a$, is freely hinged to a fixed point A . A particle of mass m is attached to the rod at B . The rod is held in equilibrium at an angle θ to the horizontal by a force of magnitude F acting at the point C on the rod, where $AC = b$, as shown in Figure 3. The force at C acts at right angles to AB and in the vertical plane containing AB .

- (b) Find, in terms of a , b , g , m and θ ,

- (i) the horizontal component of the force acting on the rod at A ,
 - (ii) the vertical component of the force acting on the rod at A .
- (5)**

Given that the force acting on the rod at A acts along the rod,

- (c) find the value of $\frac{a}{b}$. (4)





Q5

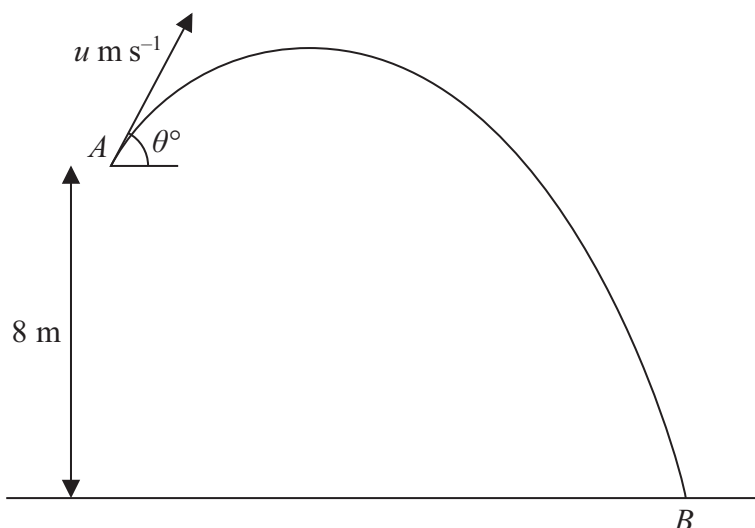


Figure 4

(a) By considering energy, find the value of u .

(5)

(b) the value of θ ,

(4)

(c) the minimum speed of the ball on its path from A to B .

(2)







(Total 11 marks)

Q6







