3.7 Mechanics: Moments and Statics Depth: 10-minute Pack

EDEXCEL 9MA0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A uniform rod AB has weight 90 N and rests horizontally in equilibrium on a single smooth pivot at its midpoint. State the reaction at the pivot.

(Total for Question 1 is 1 mark)

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2 A moment of 96 N m is required to turn a lever about its pivot. A force of 160 N is applied perpendicular to the lever. Find the minimum distance from the pivot at which the force must act.

(Total for Question 2 is 1 mark)

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3 Two weights of 20 N and 30 N hang from a light rod at distances 0.6 m and 0.4 m from a pivot O, both on the same side of the pivot. Find the total moment of these two weights about O.

(Total for Question 3 is 1 mark)

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4 A light rigid rod AB has length 1.1 m. It rests horizontally in equilibrium on a smooth pivot at the point C on the rod. Weights of 40 N and 70 N hang from hooks on the rod at distances 0.25 m and 0.5 m from C, on one side of the pivot. A weight of magnitude W newtons hangs from a hook at a distance 0.6 m from C, on the other side of the pivot.

(a) By taking moments about C, show that W = 75. **(3)**

(b) Find the reaction at the pivot C. **(2)**

(Total for Question 4 is 5 marks)

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Mark scheme · 3.7 Mechanics: Moments and Statics Depth: 10-minute Pack

Question 1

90 cao **B1**

Answer: 90 N

Question 2

0.6 cao **B1**

Answer: 0.6 m

Question 3

24 cao **B1**

Answer: 24 N m

Question 4

(a) sets up the moments equation about C for the two sides of the pivot **M1**

(a) 40 * 0.25 + 70 * 0.5 = W * 0.6 (i.e. 10 + 35 = 0.6W) **A1**

(a) W = 75 cso **A1**

(a) Answer: W = 75 N (shown)

(b) resolves vertically: R = 40 + 70 + 75 **M1**

(b) R = 185 N cao **A1**

(b) Answer: 185 N

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