

Engineering Studies

Section III (continued)

Marks

Question 18 — Engineering and the Engineering Report (10 marks)

- (a) Discuss the use of CAD systems as an alternative to traditional drawing methods. **3**

CAD allows for a quicker method for drawing and provides a system where changes in design can be easily made as opposed to rubbers and redrawing however operators need to know how to use the programme whereas most people are able to use a pencil and drawing board.

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Question 18 (continued)

(b)



- (i) In many public areas, polymer containers similar to those shown are provided for rubbish and recyclable materials. Describe a forming process to produce the main body of these large containers. 2

Vacuum forming where the softened polymer is "sucked" against a mould in order to gain a hollow center ~~for~~ as a container

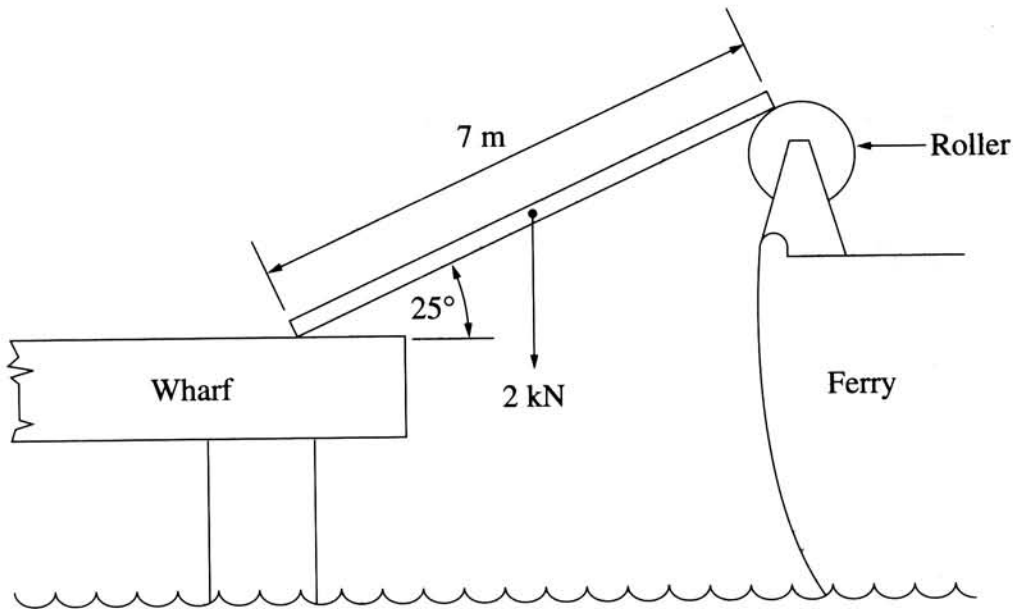
- (ii) The lids used for the containers are moulded from polyethylene. Outline the reasons for this being a suitable choice of material in service. 2

Polyethylene is a durable polymer that is easy to manufacture. It is easily shaped and therefore is suitable in an outdoor environment where it is exposed to weather and constant use.

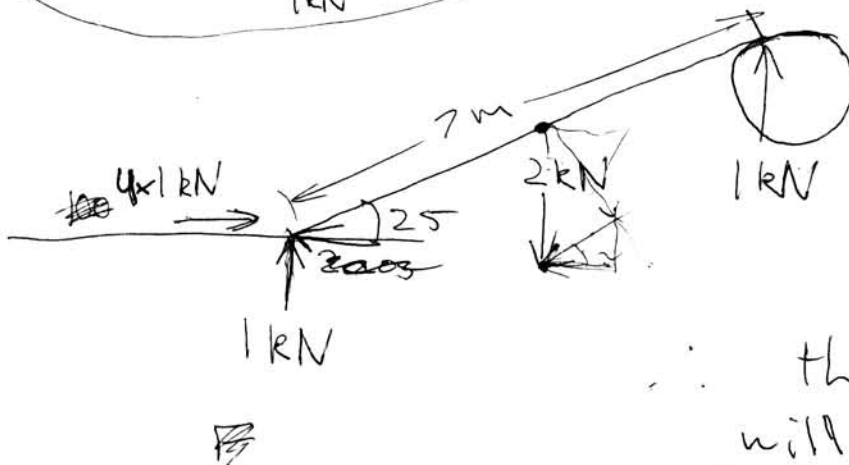
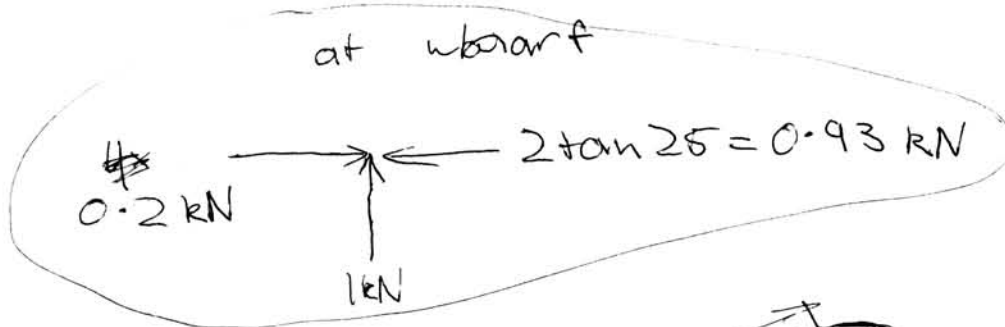
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Question 18 (continued)

- (c) A loading ramp between a ferry and a wharf is shown. The ramp has a weight of 2 kN and a coefficient of static friction with the wharf of 0.2. There is no friction at the roller support. 3



Sketch a free-body diagram of the ramp. Show whether the ramp will slip or remain static for these conditions.



∴ the beam/ramp will slide as friction force is less than the force from the ramp.

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