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**

Using CAD, drawings can be made quicker, they are much more accurate, they can be transfered easily electronicly. changes can be made easily. However, it requires computer knowledge, also require knowledge of particular CAD software, may be more expensive to set up. Accurate hand drawing were considered an art, now there is less satisfaction in the final product.

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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

Centrifugal casting is used for large hollow objects such as this. A molten plastic is placed into a die that is spun around. The centrifugal force on the plastic forces it to take the shape of the die, while keeping the inside hollow.

(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 used because it is relatively cheap to manufacture in large quantites, and also it does not resists corrosion due to UV light (ie sunlight) hitting it for long periods of time.

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(c) A loading ramp between a ferry and a wharf is shown. The ramp has a weight **3**
of 2 kN and a coefficient of static friction with the wharf of 0.2. There is no
friction at the roller support.
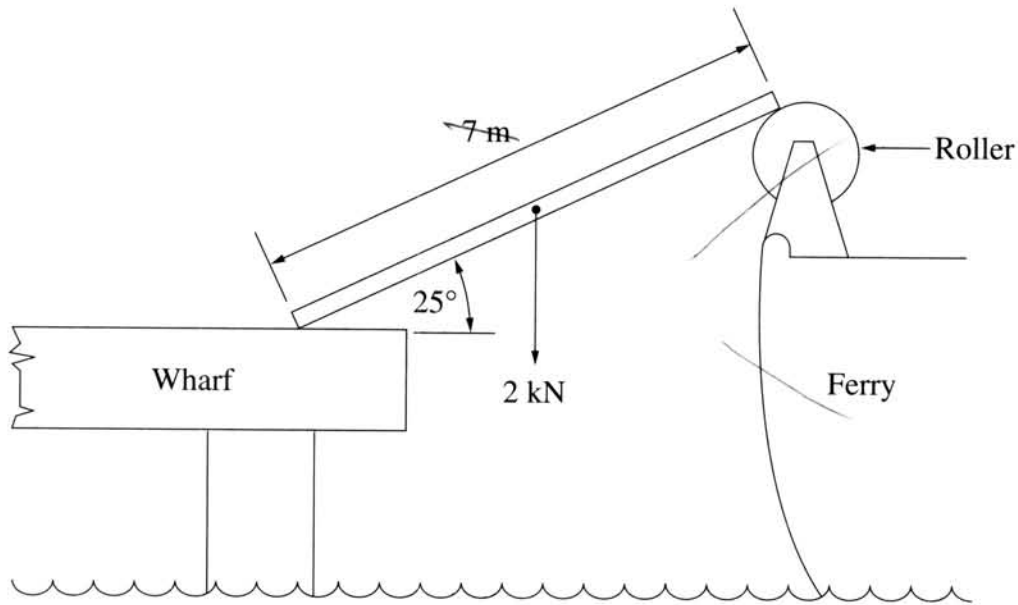
Sketch a free-body diagram of the ramp. Show whether the ramp will slip or
remain static for these conditions.

SOH CAH TOA

$\sin 25 = \dfrac{2}{x}$

$x = 4.$

$\tan 25 = \dfrac{2}{x}$

$\therefore x = 4.29\ kN$

at the point of sliding,

$\tan \theta = \mu$

$\tan 25 = 0.466$, coefficient of

which is greater than the friction

between the two $\therefore$ the ramp

will slip.

End of paper