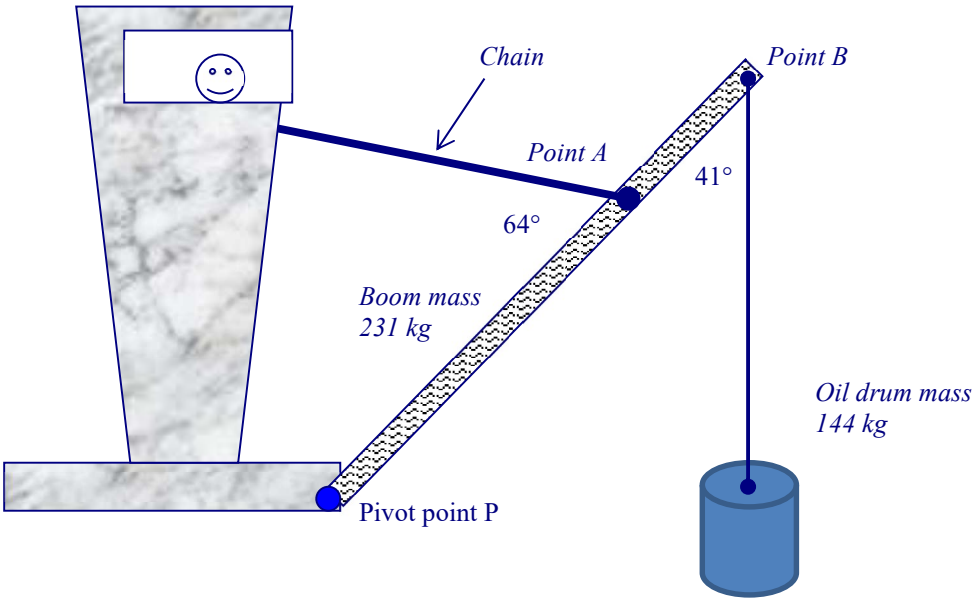
Question 16 (9 marks)

A crane at Fremantle port is unloading an oil drum from a ship.

- The boom of the crane has a mass of 231 kg and is pivoted at point P.
- The oil drum of mass 144 kg is suspended from point B. Its rope makes an angle of 41° with the boom.
- A chain attached at point A is holding the boom in position. The distance from P to A is 3.80 m.
- The chain makes an angle of 64° with the boom.
- The boom has a length of 4.50 m from P to B with uniform mass distribution.



a. Demonstrate by calculation that the tension in the chain = 2.20 x 10^3 N.

(4)

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b. Calculate the magnitude of the **reaction force** acting on the boom from the pivot.

(3)

c. Calculate the direction of the **reaction force** acting on the boom from the pivot.

(2)

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