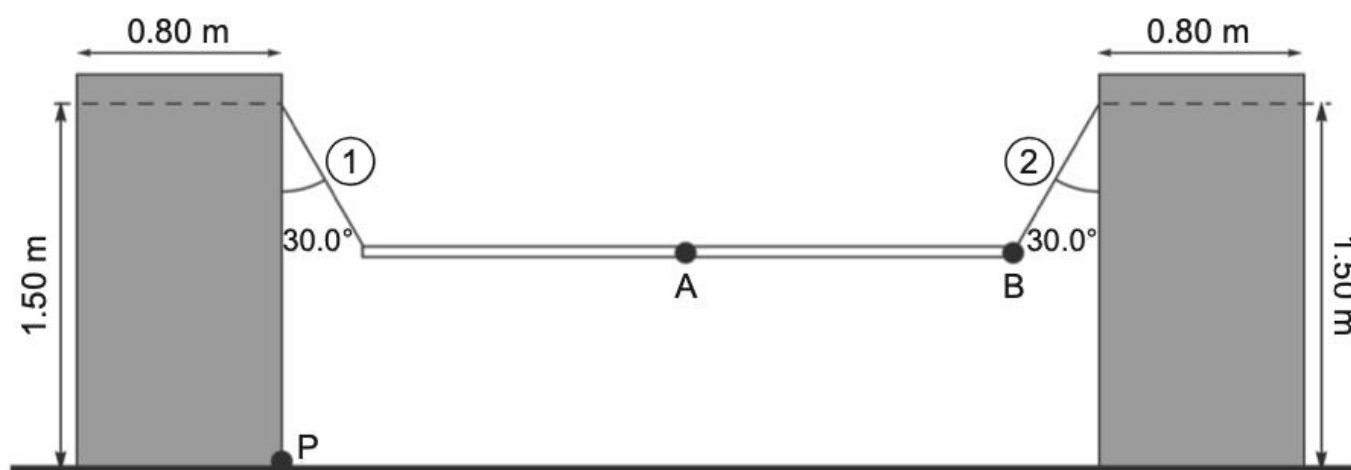


Question 12

(12 marks)



An ultra-lightweight 2.00 kg aluminium plank is suspended between two 70.0 kg uniform free-standing supports as part of a children's obstacle course. It is attached to the supports by two chains of equal length. Due to safety restrictions, the apparatus has a maximum load of 60.0 kg. A father with a mass of 80.0 kg mistakenly sits on the plank, halfway between the two supports at point A. His mass exceeds the safety limit, so the free-standing supports should tip inward.

- (a) Calculate the tension in each chain when the father sits on the plank, assuming the supports do not tip over. (4 marks)

Answer: _____ N

- (b) Calculate the horizontal component of the tension in each chain. (1 mark)

Answer: _____ N

- (c) With the use of a calculation, confirm that the supports do tip over when the father sits on the plank. Take moments around P. (5 marks)

- (d) Without the use of additional calculations, describe how the tension in each chain would be affected if a 50.0 kg person sitting at A moved to B? Select either increases, decreases or remains constant. (2 marks)

Chain 1	Chain 2