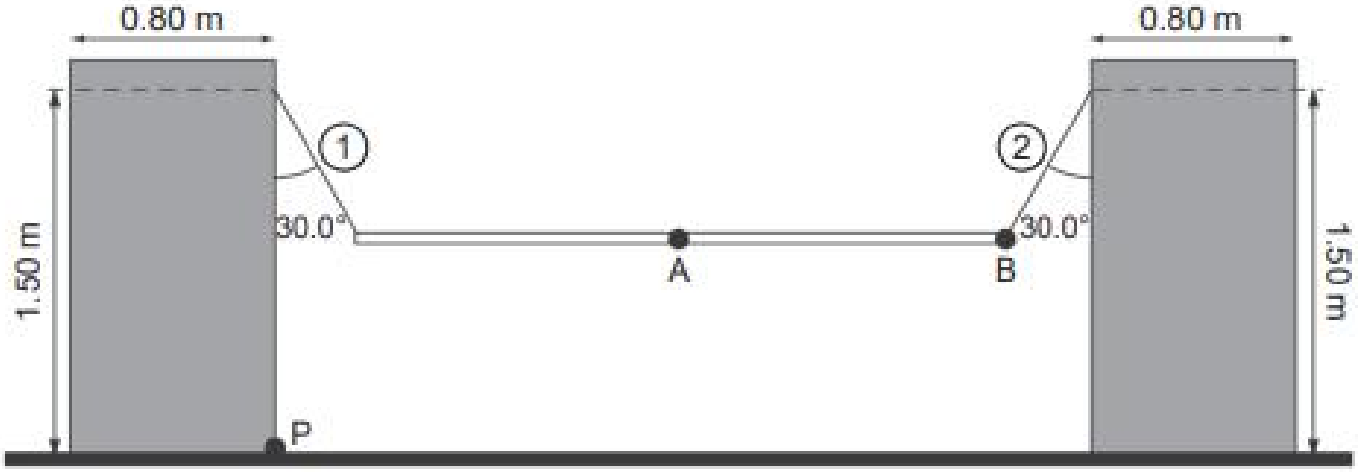
Question 12 **(12 marks)**



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