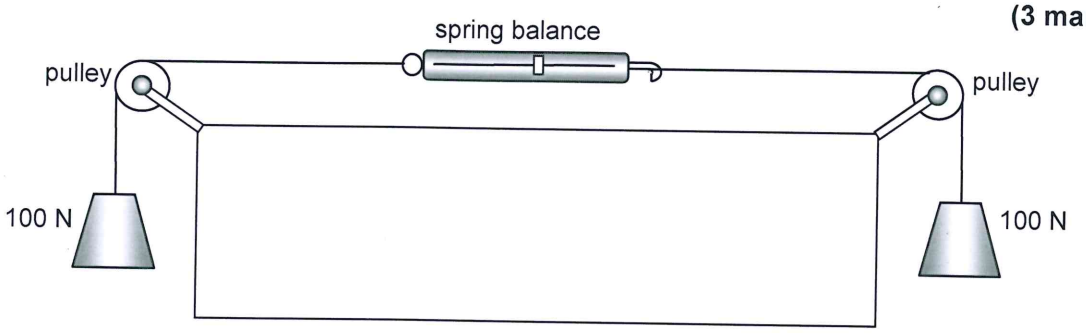
Exam Questions

Chapter 1·2 - Inclined Planes

Question 1 2010:1:2

(3 marks)



(a) What is the reading on the spring balance? Circle your answer. (1 mark)

(i) 100 N (ii) Zero (iii) 200 N

(b) Choose **one** of the answers that you **rejected** and give your reason why you rejected it. (2 marks)

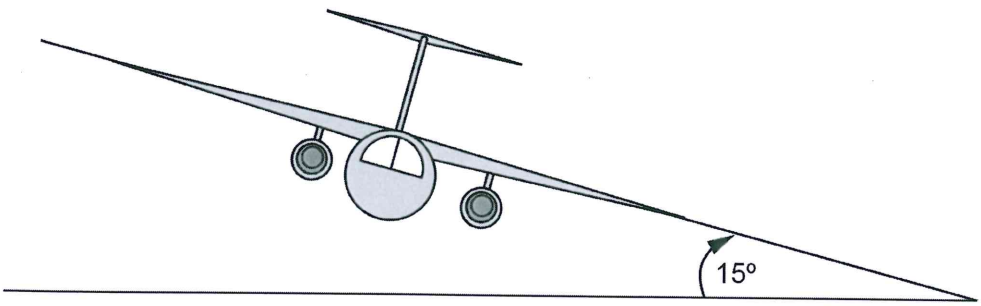
Question 2 2013:2:17

(12 marks)

An aircraft is flying horizontally with a constant speed of 600 km h^{-1} at an altitude of 5000 m. The upward (lift) force provided by the wings that is necessary to keep the aircraft in level flight is 9.80×10^4 N.

(a) Show that the mass of the aircraft must be 1.00×10^4 kg. (3 marks)

(b) The pilot begins a turn by tilting the aircraft so that its wings are at 15.0° to the horizontal as shown. Assume that the airspeed does not change, and that the size and angle to the wing of the lift force remain constant.



Draw a free body diagram below labelling the forces acting on the aircraft. Ignore drag/friction and thrust forces directed into and out of the page. (2 marks)

(c) Calculate the horizontal radius of the aircraft's turn, assuming the airspeed does not change. (5 marks)

(d) Describe any effects that this turn will have on the altitude of the aircraft. No calculations are required. (2 marks)

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Question 3 2014:1:5

(5 marks)

An aircraft attempts to land along a north-south aligned landing strip. It approaches from the south and has an air speed of 133 km hr^{-1}. The wind is blowing from the west at 45.0 km hr^{-1}. Draw a vector diagram to show the direction the aircraft needs to head and calculate its actual velocity, in m s^{-1}, relative to the runway. Show **all** workings.