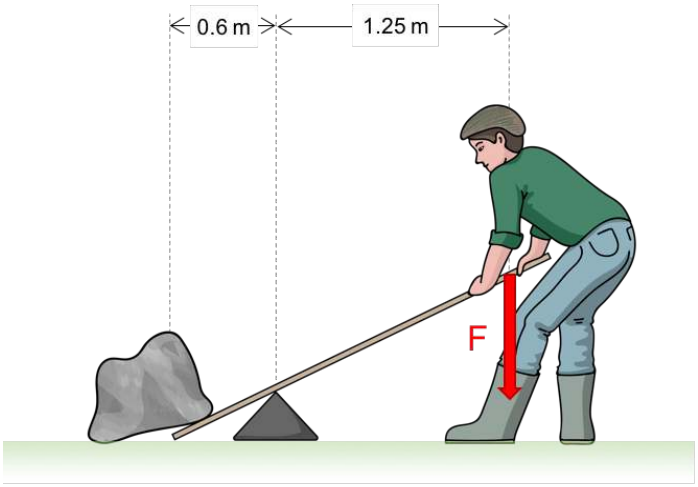
0 1 A man is using a lever to lift a heavy rock, as shown below.



0 1 . 1 The mass of the rock is 70 kg. Calculate its weight. Take g = 9.8 N/kg.

Weight = _____ N

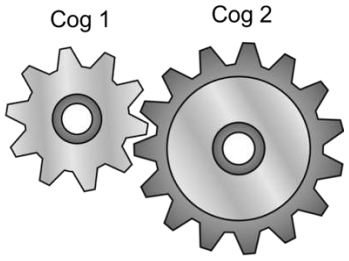
[2 marks]

0 1 . 2 Determine the minimum downwards force (F) which the man must apply to the end of the lever to lift the rock.

F = _____ N

[2 marks]

0 2 The below diagram shows two of the cogs which are used inside an antique watch. Information on each cog is also displayed below.



Cog number	Number of teeth	Radius (mm)
1	10	5.0
2	15	7.5

0 2 . 1 A force of 0.1 N is applied to cog 1. Calculate the moment of this force about the centre of the cog. Include an appropriate unit with your answer.

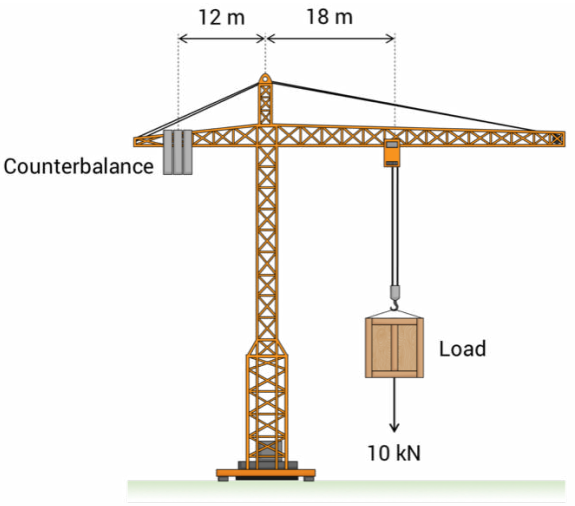
Moment = _____ Unit _____

[3 marks]

0 2 . 2 Show that the moment (turning effect) produced about cog 2 as a result of this force is 50% larger than that produced about cog 1.

[3 marks]

0 3 A crane is being used to lift a 10 kN load on a building site.



0 3 . 1 State the Principle of Moments.

[3 marks]

0 3 . 2 Calculate the **mass** of counterbalance required for the above crane to be in equilibrium. You may neglect the weight of the crane in your calculation, and should take the value of g to be 9.8 N/kg.

Mass = _____ kg

[4 marks]

0 3 . 3 If the load is moved much closer to the base of the crane, the counterbalance might need to be adjusted. Suggest a reason why.

[2 marks]