Forces and Newton's laws – A2 Mathematics P2

1. June/2022/Paper_7357/02/No.11

A moon vehicle has a mass of 212kg and a length of 3 metres.

On the moon the vehicle has a weight of 345 N

Calculate a value for acceleration due to gravity on the moon.

Circle your answer.

[1 mark]

 $0.614\,\mathrm{m\,s^{-2}}$ $1.63\,\mathrm{m\,s^{-2}}$ $1.84\,\mathrm{m\,s^{-2}}$ $4.89\,\mathrm{m\,s^{-2}}$

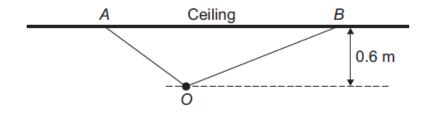
2. June/2022/Paper_7357/02/No.18

An object, O, of mass m kilograms is hanging from a ceiling by two light, inelastic strings of different lengths.

The shorter string, of length 0.8 metres, is fixed to the ceiling at A.

The longer string, of length 1.2 metres, is fixed to the ceiling at B.

This object hangs 0.6 metres directly below the ceiling as shown in the diagram.



longer string.		g is over 30% more than the ten		
			[4 mark	

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The tension in the longer string is known to be 2g newtons.

(b)

Find the value of <i>m</i> .	[4 marks]

3.	June/	2022	/Paper_	7357	/02/1	No.19
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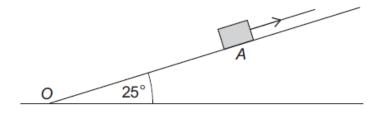
In this question use $g = 9.8 \,\mathrm{m\,s^{-2}}$

A rough wooden ramp is 10 metres long and is inclined at an angle of 25° above the horizontal. The bottom of the ramp is at the point O.

A crate of mass 20 kg is at rest at the point A on the ramp.

The crate is pulled up the ramp using a rope attached to the crate.

Once in motion, the rope remains taut and parallel to the line of greatest slope of the ramp.



(a) The tension in the rope is 230 N

The crate accelerates up the ramp at 1.2 m s⁻²

Find the coefficient of friction between the crate and the ramp.

[7 marks]

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(b) (i)	The crate takes 3.8 seconds to reach the top of the ramp.			
	Find the distance OA. [3 marks]			
(b) (ii)	Other than air resistance, state one assumption you have made about the crate in answering part (b)(i). [1 ma			