

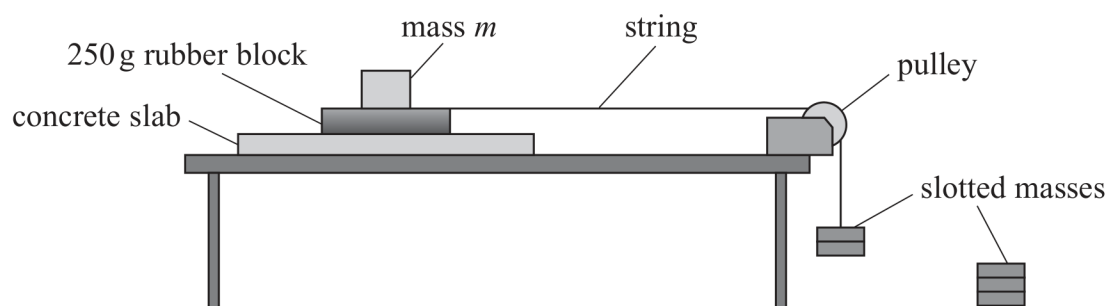
- 4 When an object is in contact with a horizontal surface, there is a maximum frictional force F between the object and the surface before sliding occurs.

F is given by the equation

$$F = \mu N$$

where μ is a constant and N is the normal contact force between the object and the surface.

A student investigated this relationship for a rubber block on a concrete surface. She set up the apparatus as shown in the diagram.



- (a) Describe how the student can determine F for the situation shown.

(2)

- (b) The student varied the mass m placed on top of the rubber block and determined corresponding values of F .

Her results are shown in the table.

m/g	N/N	F/N
0	2.45	1.4
200	4.41	2.5
400	6.38	4.0
600	8.34	4.6
800	10.3	5.8

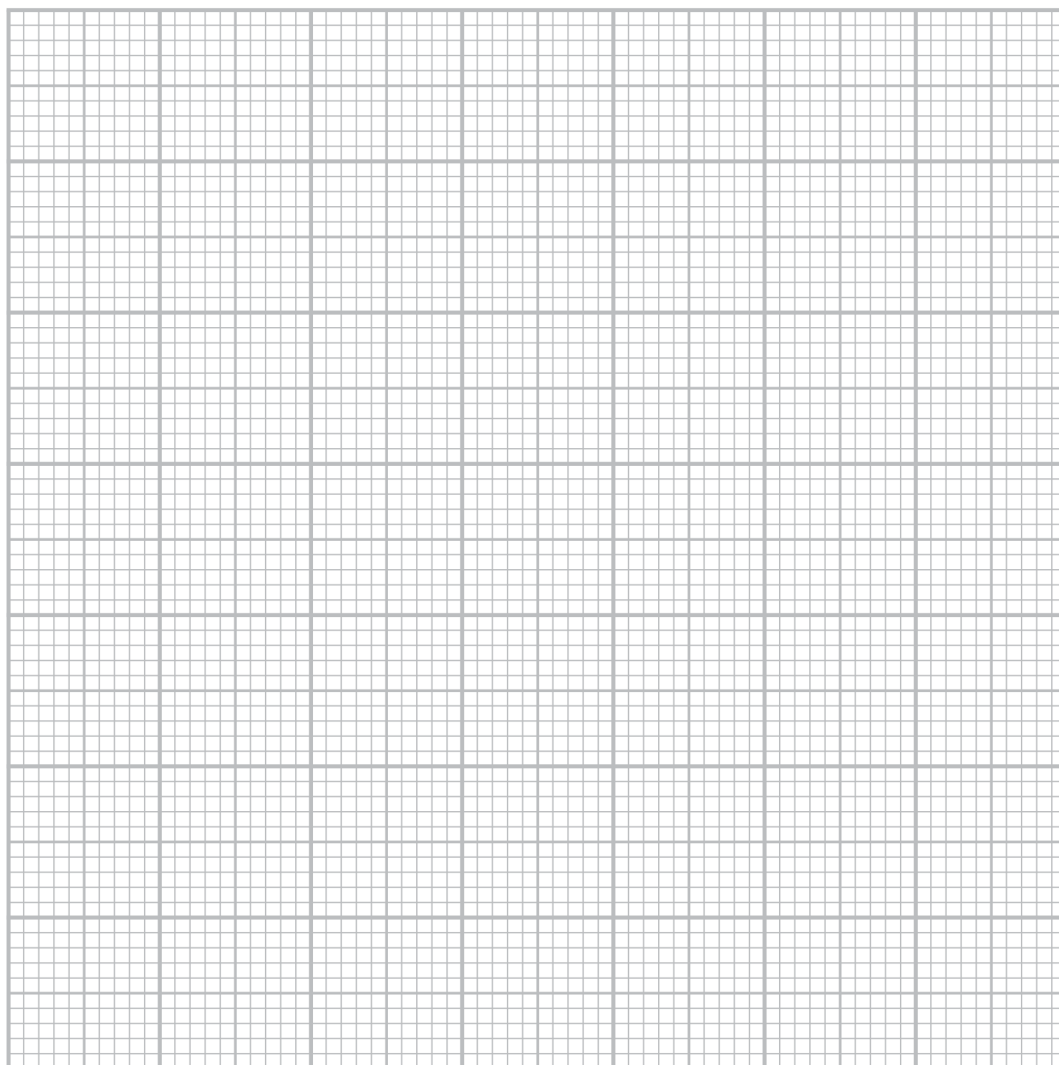
- (i) Explain how the values of N are calculated.

(2)



(ii) Plot a graph of F on the y -axis against N on the x -axis using the grid below.

(5)



(c) Determine a value for μ .

(3)

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$\mu =$



(d) A tyre manufacturer carries out similar tests on samples of the rubber used for tyres.

Suggest why these tests are necessary.

(2)

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(Total for Question 4 = 14 marks)