3.6 Mechanics: Forces and Newton's Laws Depth: 10-minute Pack

Total Marks

EDEXCEL 9MA0 · Calculator allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Two forces, (3i + 4j) N and (1i - 2j) N, act on a particle. Find the resultant force, giving your answer in the form (π + qj) N.

(Total for Question 1 is 1 mark)

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2 A block of mass 5 kg experiences a normal reaction of 39.2 N and a maximum friction force of 15.68 N. Find the coefficient of friction between the block and the surface.

(Total for Question 2 is 1 mark)

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3 State the direction in which friction acts on a block that is on the point of sliding up a rough inclined plane.

(Total for Question 3 is 1 mark)

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4 A particle A of mass 3 kg lies on a smooth horizontal table and is connected by a light inextensible string, passing over a smooth pulley, to a particle B hanging freely. Given that the acceleration of the system is 3.92 m/s^2, find the tension in the string by considering particle A alone.

(Total for Question 4 is 2 marks)

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5 A block of mass 6 kg rests on rough horizontal ground and is on the point of sliding when a horizontal force of 18 N is applied. Take g = 9.8 m/s^2. Find the coefficient of friction between the block and the ground, giving your answer to 3 significant figures.

(Total for Question 5 is 2 marks)

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6 A person of mass 70 kg stands on the floor of a lift that is moving downward and decelerating at 1.2 m/s^2. Take g = 9.8 m/s^2. Find the normal reaction force exerted on the person by the lift floor.

(Total for Question 6 is 2 marks)

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Mark scheme · 3.6 Mechanics: Forces and Newton's Laws Depth: 10-minute Pack

Question 1

(4i + 2j) N cao **B1**

Answer: (4i + 2j) N

Question 2

0.4 cao **B1**

Answer: 0.4

Question 3

friction acts down the plane, opposing the impending motion **B1**

Answer: Down the plane (opposing the impending motion).

Question 4

equation of motion for A: T = 3a (the table is smooth, so tension is the only horizontal force) **M1**

11.76 N cao **A1**

Answer: 11.76 N

Question 5

R = mg = 58.8, μ = 18/58.8 **M1**

awrt 0.306 **A1**

Answer: 0.306 (3 s.f.)

Question 6

decelerating while moving down means the acceleration is upward: R - mg = ma with a=+1.2 **M1**

770 N cao **A1**

Answer: 770 N

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