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Quiz 2

Started on

Thursday, 14 March 2024, 9:10 AM

State

Finished

Completed on

Thursday, 14 March 2024, 10:10 AM

Time taken

59 mins 56 secs

Question 1

Incorrect

Marked out of 1.00

Flag question

A marble with mass m is travelling on a frictionless, horizontal floor with velocity v . It then travels up a slope and come to a stop at a vertical height of h , before travelling backwards. If instead, another marble of mass $3m$ with a velocity v travels up the same slope, what would be the vertical height for it to stop before travelling backwards? You may neglect air resistance.

Select one:

a.

3h

b.

$h/3$

c.

$h/2$

d.

$h/2$

e.

$2h$

Question 2

Correct

Marked out of 1.00

Flag question

A 0.5 kg book with initial velocity 2.0 m/s slides on a rough horizontal surface for 4.0 m before coming to a stop. Calculate the coefficient of kinetic friction between the surface and the book.

Select one:

a.

0.535

b.

0.152

c.

1.000

d.

0.251

e.

0.051

Question 3

Incorrect

Marked out of 1.00

Flag question

On the energy diagram, when the corresponding F - x graph shows a value of $F(x) = 0$, which statement best describes the object at that position?

Select one:

a.

It is in unstable equilibrium

b.

It is in stable equilibrium.

c.

It is not in equilibrium.

d.

It could either be in stable equilibrium, unstable equilibrium, or neutral equilibrium.

e.

It is in neutral equilibrium.

Question 4

Incorrect

Marked out of 1.00

Flag question

A 60 kg man fall from a height of 4.3 m onto a trampoline. Neglect air resistance and assume that the trampoline is a spring with spring constant 627.4 N/m, what is the maximum compression of the trampoline in metres?

Select one:

a.

1.51

b.

1.23

c.

2.33

d.

3.93

e.

2.84

Question 5

Incorrect

Marked out of 1.00

Remove flag

A boy is playing with a toy car of mass 0.85 kg. The toy car has an internal spring which stores energy when the toy car is pulled back against a surface. The boy pulls back the toy car and releases it upwards on a slope with an inclination of 15 degrees. Just before release, the spring has stored an energy of 5.9 J. As the toy car travels, there is a constant friction force of 0.50 N between the toy car and the slope surface. How far will the toy car travel before coming to a stop? You may assume that the toy car is a point mass.

Select one:

a.

1.8 m

b.

0.69 m

c.

2.7 m

d.

2.2 m

e.

0.73 m

Question 6

Correct

Marked out of 1.00

Remove flag

Energy is to be stored in a big 90.0 kg metal ring in the shape of a uniform thin cylindrical shell with radius $R=1.20$ m. The maximum allowed radial acceleration of any point is 3400 m/s^2 . What is the maximum kinetic energy that can be stored in the ring?

Select one:

a.

123.2 kJ

b.

133.9 kJ

c.

183.6 kJ

d.

162.6 kJ

e.

173.6 kJ

Question 7

Correct

Marked out of 1.00

Flag question

What is the moment of inertia of a thin spherical shell of radius r with mass m , about the axis $r/3$ from its centre?

Select one:

a.

$(3/5)mr^2$

b.

$(7/9)mr^2$

c.

$(13/20)mr^2$

d.

$(2/7)mr^2$

e.

$(5/9)mr^2$

Question 8

Correct

Marked out of 1.00

Remove flag

A rotating object is to lose 480 J of kinetic energy when the angular velocity drops from 740 rev/min to 610 rev/min. What is the moment of inertia of the object?

Select one:

a.

0.662 kgm²

b.

0.701 kgm²

c.

0.499 kgm²

d.

0.585 kgm²

e.

0.600 kgm²

Question 9

Incorrect

Marked out of 1.00

Remove flag

A wheel is part of a complex machinery system designed for precision manufacturing. Initially, it has an angular velocity of 23.87 rev/min. As part of the system's operation, this wheel experiences a constant angular acceleration. During a particular phase of operation, the control system applies an angular acceleration of 0.4330 rad/s^2 to the wheel. Calculate the wheel's angular velocity after 2.600 seconds of applying this constant angular acceleration.

Select one:

a.

7.458 rad/s

b.

21.10 rad/s

c.

24.96 rad/s

d.

3.625 rad/s

e.

15.13 rad/s

Question 10

Correct

Marked out of 1.00

Flag question

A football of mass 0.5 kg is kicked from rest and reaches a velocity of 20 m/s in 0.05 seconds. Calculate the average force exerted on the football during the kick.

Select one:

a.

100 N

b.

1 N

c.

50 N

d.

10 N

e.

200 N

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