A Level · OCR · Physics

10 mins 10 questions

Multiple Choice Questions

Linear & Projectile Motion

SUVAT Equations / Investigating Motion & Collisions / Acceleration & Free Fall / Braking & Reaction Times / Projectile Motion

Medium (5 questions)	/5
Hard (5 questions)	/5
Total Marks	**/10**

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Medium Questions

1 The braking distance of a car is directly proportional to its initial kinetic energy.

The braking distance of a car is 18 m when its initial speed is 10 m s^{-1}.

What is the braking distance of the car, under the same conditions, when its initial speed is 25 m s^{-1}?

A. 7.2 m

B. 45 m

C. 113 m

D. 222 m

(1 mark)

2 An object above the ground is released from rest at time $t = 0$.

Air resistance is negligible.

What is the distance travelled by the object between $t = 0.20$ s and $t = 0.30$ s?

A. 0.20 m

B. 0.25 m

C. 0.44 m

D. 0.49 m

(1 mark)

3 A projectile is launched 35° to the horizontal with an initial velocity of 6.5 m s^{-1}.

Air resistance is negligible.

How long does it take for the projectile to reach its highest point?

A. 0.38 s

B. 1.3 s

C. 1.1 s

D. 0.76 s

(1 mark)

4 A stone is launched horizontally from the top of a cliff above the sea. It lands 45 m away from its starting position, and has an initial horizontal velocity of 11.25 m s^{-1}.

What is the height of the cliff?

A. 78 m

B. 20 m

C. 123 m

D. 65 m

(1 mark)

5 A cricket ball with a mass of 1 kg, and a bowling ball with a mass of 5 kg are dropped from a height of 120 cm.

Air resistance is negligible.

Which of the following statements is **true**?

A. The force of the bowling ball hitting the ground is equal to the force of the cricket ball hitting the ground

B. The bowling ball will hit the ground before the cricket ball does

C. The speed of the bowling ball hitting the ground will be greater than the speed of the cricket ball

D. The time it takes for the bowling ball to hit the ground is 0.49 s

(1 mark)

Hard Questions

1 The table shows some data for a car travelling on a straight road with an initial speed of 13 m s^{-1}.

Thinking distance / m	**9.0**
Braking distance / m	**14**
Stopping distance / m	**23**

The car has a constant deceleration when the brakes are applied.

What is the magnitude of the deceleration of the car during braking?

A. 0.46 m s^{-2}

B. 3.7 m s^{-2}

C. 6.0 m s^{-2}

D. 9.4 m s^{-2}

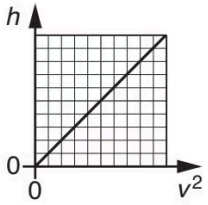
(1 mark)

2 A ball is dropped from rest above the ground. Air resistance has negligible effect on the motion of the ball.

The speed of the ball is *v* after it has fallen a distance *h* from its point of release.

Which graph is correct for this falling ball?

A



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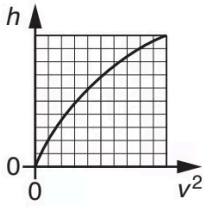

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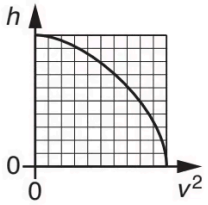

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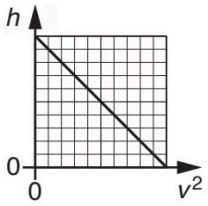

(1 mark)

3 Two particles, **P** and **Q**, have constant accelerations 0.7 m s^{-2} and 0.4 m s^{-2} respectively. At t = 0 s Particle **P** is at rest and Particle **Q** has an initial velocity of 5 m s^{-1}.

What is the value of t when the velocities of the particles are equal?

A. 16.7 s

B. 12.5 s

C. 4.55 s

D. 0.06 s

(1 mark)

4 Two identical cannonballs, **W** and **Z**, are fired. Cannonball **W** is fired at 13° to the horizontal and has an initial velocity of 24 m s^{-1}. Cannonball **Z** is fired at 29° and has an initial velocity of 9 m s^{-1}.

Air resistance is negligible.

Which of the following statements is **true**?

A. Cannonball **Z** reaches a height of 3.2 m

B. Cannonball **W** will hit the ground first

C. Cannonball **W** reaches the greatest height

D. The cannonballs will hit the ground at the same time

(1 mark)

5 A particle is fired with an initial velocity of 8.5 m s^{-1} at an angle of 55° to the horizontal.

Air resistance is negligible.

Which statement best describes the vertical velocity-time graph of the particle?

A. A straight line starting from the origin, with a gradient of - 10, and a final velocity of 5 m s^{-1}

B. A curved line starting from the origin, with a varying gradient, and a final velocity of 7 m s^{-1}

C. A curved line starting from 5 m s^{-1}, with an initial gradient of - 10, and a final velocity of - 5 m s^{-1}

D. A straight line starting from 7 m s^{-1}, with a gradient of - 10, and a final velocity of - 7 m s^{-1}

(1 mark)