

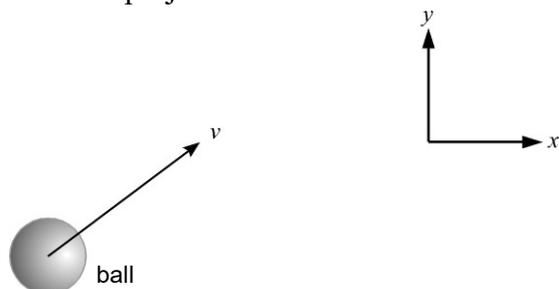
Chapter 11 Projectile Motion

Multiple Choice Questions

(Level 1)

*Code: 11L1A001, Total marks: 1

A ball is projected into the air as shown.



Neglecting the effect of air resistance, the horizontal component v_x of its velocity v

- A. increases with time.
- B. decreases with x .
- C. is zero.
- D. does not change.

Answer: D

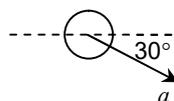
*Code: 11L1A002, Total marks: 1

A ball is projected upwards at an angle of 30° to the horizontal. Which of the following diagrams best illustrates the acceleration a of the ball when it is at the highest position?

A.



B.



C.



D.

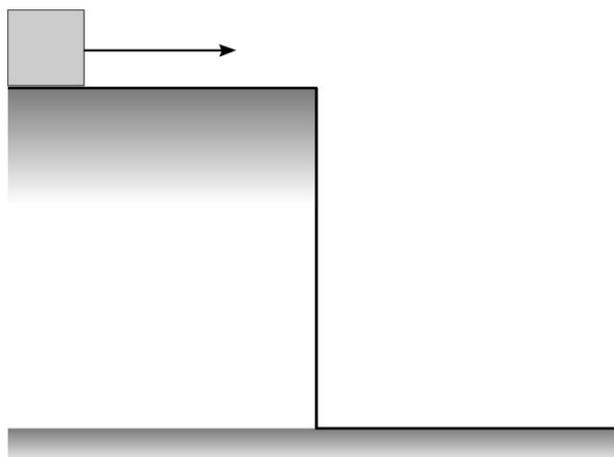


Answer: C

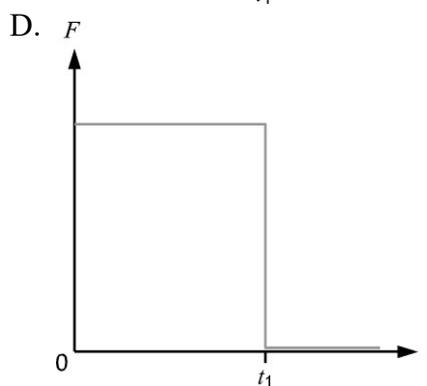
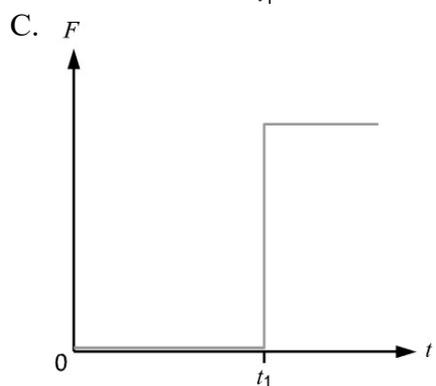
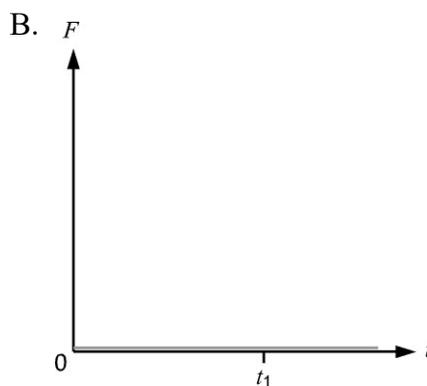
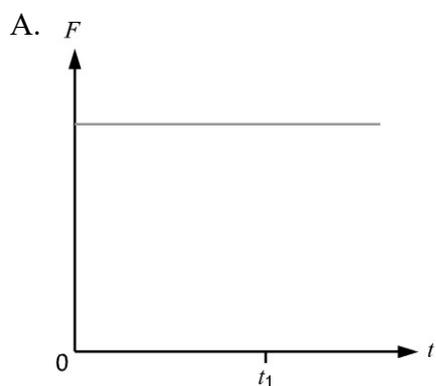
*Code: 11L1A003, Total marks: 1

Initially, a box slides across a horizontal platform at a uniform speed as shown. It then

falls off the edge to the ground at time t_1 .



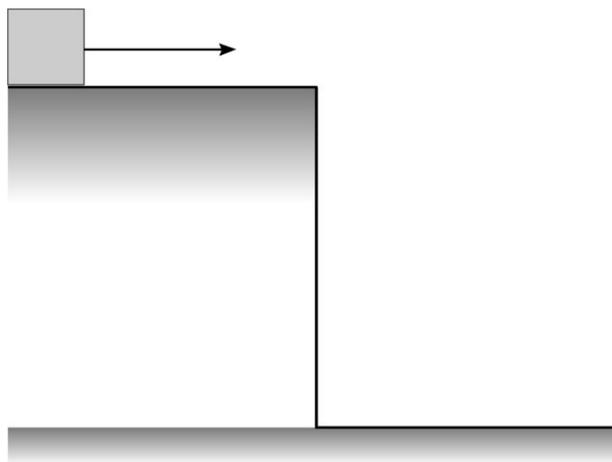
Which of the following graphs best shows how the resultant horizontal force F acting on the box varies with time t ? Neglect friction and air resistance.



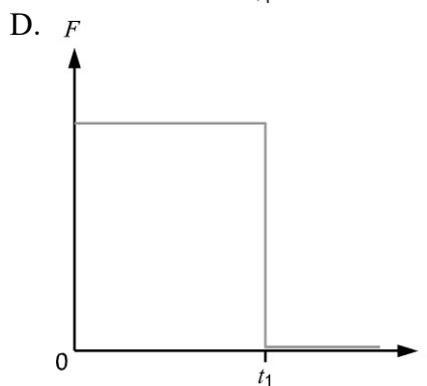
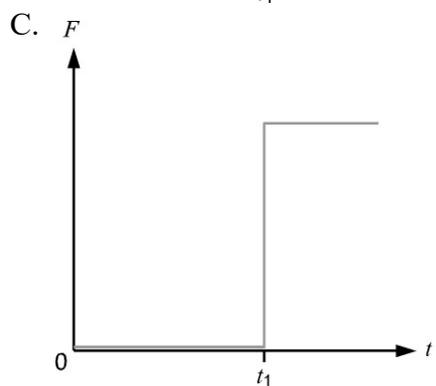
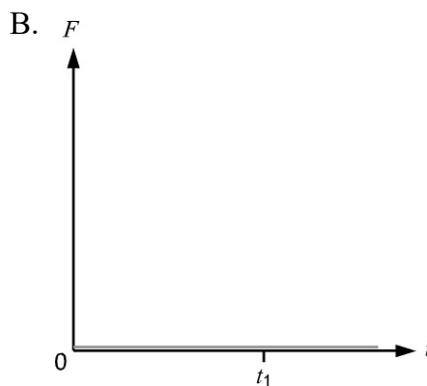
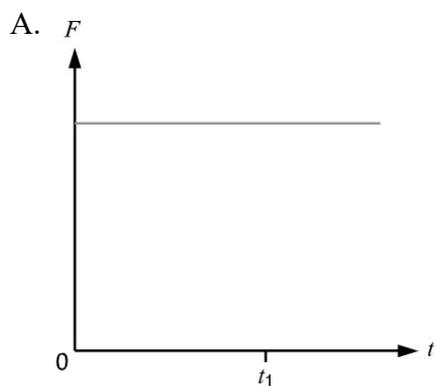
Answer: B

*Code: 11L1A004, Total marks: 1

Initially, a box slides across a horizontal platform at a uniform speed as shown. It then falls off the edge to the ground at time t_1 .



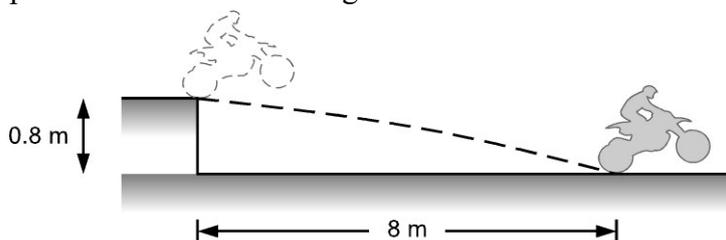
Which of the following graphs best shows how the resultant vertical force F acting on the box varies with time t ? Neglect friction and air resistance.



Answer: C

*Code: 11L1A005, Total marks: 1

A stunt man riding on his motorcycle takes off in the horizontal direction from a platform 0.8 m above the ground as shown.



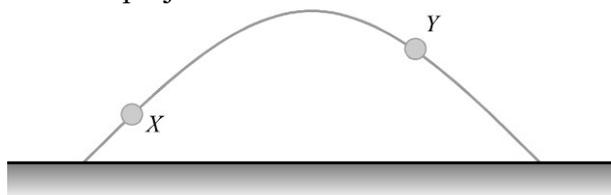
Suppose he lands at a position 8 m away, what is his take-off speed?

- A. 5 m s^{-1}
- B. 10 m s^{-1}
- C. 15 m s^{-1}
- D. 20 m s^{-1}

Answer: D

***Code: 11L1A006, Total marks: 1**

A ball is projected into the air and travels through a parabolic path as shown.



Positions X and Y are on the path. Given that position Y is higher,

- (1) the ball has more kinetic energy at Y .
 - (2) the ball has a higher speed at Y .
 - (3) the horizontal components of the velocities of the ball are the same at positions X and Y .
- A. (1) only
 - B. (3) only
 - C. (1) and (2) only
 - D. (2) and (3) only

Answer: B

***Code: 11L1A007, Total marks: 1**

A ball is projected into the air at an angle to the horizontal from the ground. The horizontal and vertical components of the initial velocity of the ball are 10 m s^{-1} and 15 m s^{-1} respectively. Neglecting the effect of air resistance, what are the horizontal and vertical components of the velocity after 2 s?

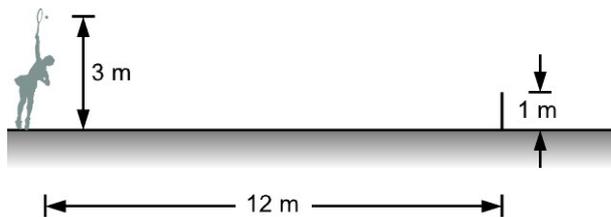
- | | horizontal | vertical |
|----|-------------------|-----------------|
| A. | -10 | -5 |
| B. | 10 | -5 |
| C. | 10 | 10 |
| D. | 15 | 10 |

Answer: B

***Code: 11L1A008, Total marks: 1**

Amy hits a tennis ball, which is initially at rest, at a height of 3 m above the ground.

The ball flies off in the horizontal direction and just passes the net which is 12 m away from the player.



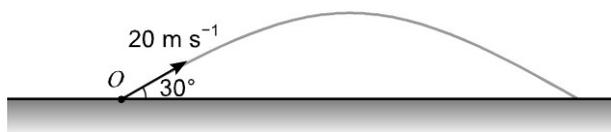
What is the time required for the ball to travel from Amy to the net?

- A. 0.4 s
- B. 0.6 s
- C. 0.632 s
- D. 0.775 s

Answer: C

***Code: 11L1A009, Total marks: 1**

A ball is projected at a velocity of 20 m s^{-1} which makes an angle of 30° to the horizontal.



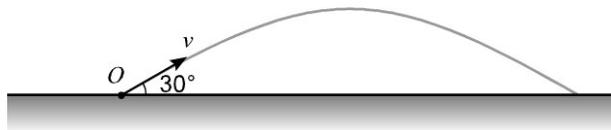
What is the range of the ball?

- A. $\frac{20 \sin 30^\circ}{g}$
- B. $\frac{400 \sin 60^\circ}{g}$
- C. $\frac{400 \sin^2 30^\circ}{g}$
- D. $\frac{400 \sin^2 60^\circ}{g}$

Answer: B

***Code: 11L1A010, Total marks: 1**

A ball is projected at a velocity of v which makes an angle of 30° to the horizontal.



In which of the following cases is the range decreased the most?

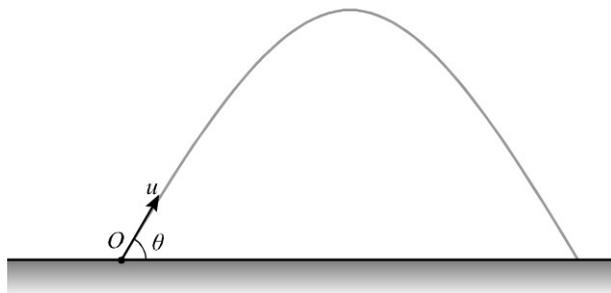
- A. Increase the velocity v to $2v$.

- B. Increase the angle of projection from 30° to 60° .
- C. Decrease the angle of projection from 30° to 15° .
- D. Decrease the velocity v to $0.5v$.

Answer: D

***Code: 11L1A011, Total marks: 1**

A ball is projected from the ground at an angle of θ to the horizontal with an initial velocity u .



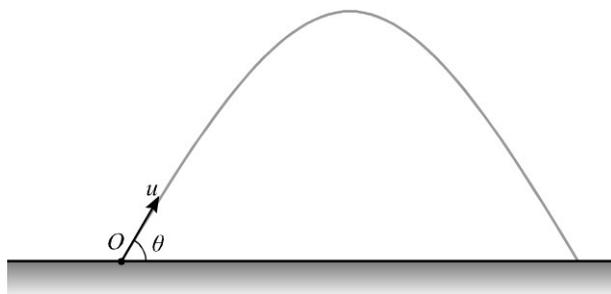
Suppose the time of flight of the ball is T , which of the following expressions is/are correct?

- (1) $T \propto u$
 - (2) $T \propto \sin \theta$
 - (3) $T \propto \sin^2 \theta$
- A. (2) only
 - B. (3) only
 - C. (1) and (2) only
 - D. (1) and (3) only

Answer: C

***Code: 11L1A012, Total marks: 1**

A ball is projected from the ground at an angle of θ to the horizontal with an initial velocity u .



Suppose the range of the ball is R , which of the following expressions is/are correct?

- (1) $T \propto u^2$

(2) $T \propto \sin \theta$

(3) $T \propto \sin^2 \theta$

A. (1) only

B. (3) only

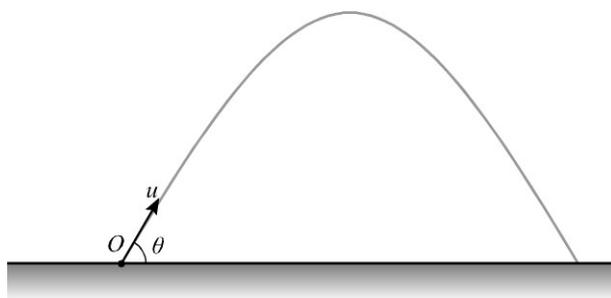
C. (1) and (2) only

D. (2) and (3) only

Answer: A

***Code: 11L1A013, Total marks: 1**

A ball is projected from the ground at an angle of θ to the horizontal with an initial velocity u .



Which of the following statements is/are correct?

(1) At the highest point, all kinetic energy of the ball has been converted to potential energy.

(2) At any two instances, the velocities of the ball are the same if it is at the same height from the ground.

(3) The range is the largest when $\theta = 45^\circ$.

A. (1) only

B. (3) only

C. (1) and (2) only

D. (2) and (3) only

Answer: B

***Code: 11L1A014, Total marks: 1**

What is the maximum range that can be reached by an object which is projected at a speed of 100 m s^{-1} from the ground?

A. 100 m

B. 500 m

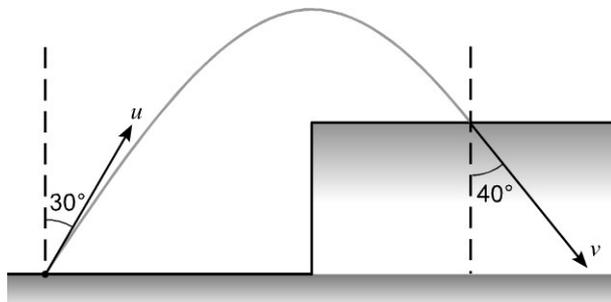
C. 1000 m

D. 5000 m

Answer: C

***Code: 11L1A015, Total marks: 1**

A ball is projected with a velocity \vec{u} at an angle of 30° to the vertical from the ground as shown. It then lands on a platform and the landing velocity \vec{v} makes an angle of 40° to the vertical.



What is the relation between u and v ?

- A. $u \sin 30^\circ = v \sin 40^\circ$
- B. $u \sin 40^\circ = v \sin 30^\circ$
- C. $u \tan 30^\circ = v \tan 40^\circ$
- D. $u \tan 40^\circ = v \tan 30^\circ$

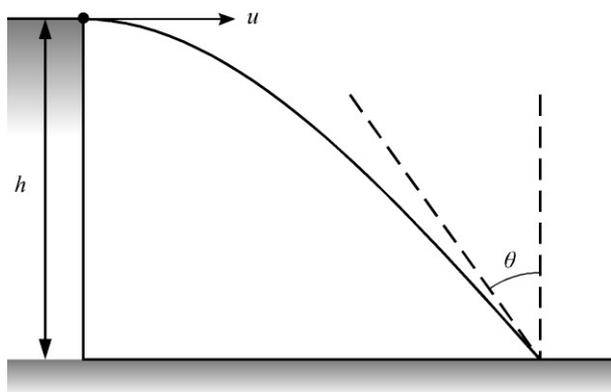
Answer: A

Multiple Choice Questions

(Level 2)

***Code: 11L2A001, Total marks: 1**

A ball is projected horizontally at a velocity $u \text{ m s}^{-1}$ from a platform $h \text{ m}$ above the ground. Eventually it lands on the ground at an angle of θ to the vertical.



Which of the following pairs gives the smallest value of θ ?

- A. $h = 10 \text{ m}, u = 3 \text{ m s}^{-1}$
- B. $h = 20 \text{ m}, u = 4 \text{ m s}^{-1}$
- C. $h = 30 \text{ m}, u = 5 \text{ m s}^{-1}$
- D. $h = 40 \text{ m}, u = 6 \text{ m s}^{-1}$