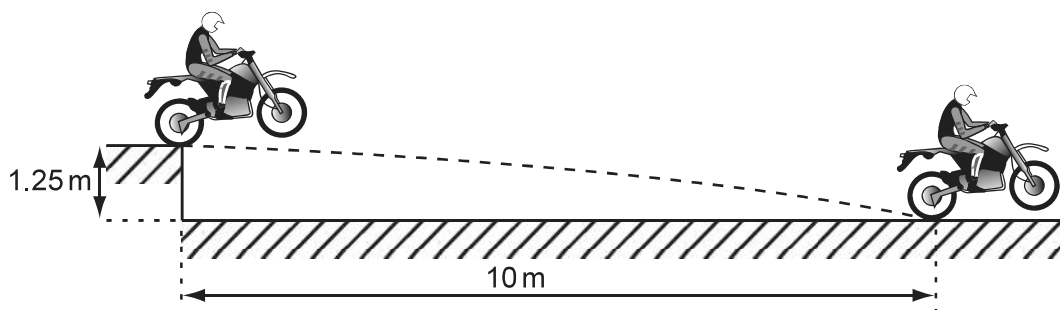1   A motorcycle stunt-rider moving horizontally takes off from a point 1.25 m above the ground,
     landing 10 m away as shown.

     1.25 m
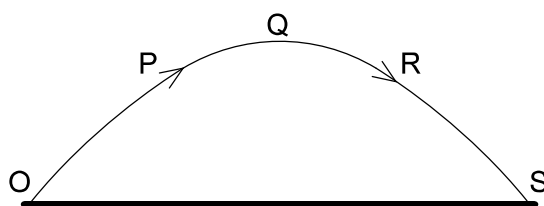
     10 m

     What was the speed at take-off?

     A   5 m s ^{1} 10 m s ^{1} 15 m s ^{1} 20 m s ^{1}

2   A projectile is launched at point O and follows the path OPQRS, as shown. Air resistance may be
     neglected.

     Which statement is true for the projectile when it is at the highest point Q of its path?

     A   The horizontal component of the projectile's acceleration is zero.

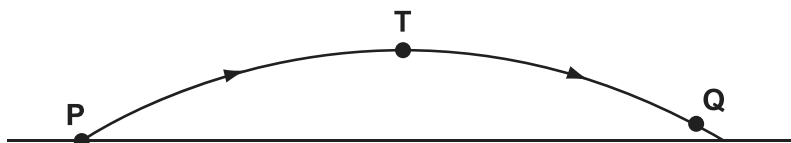   The horizontal component of the projectile's velocity is zero.

          The kinetic energy of the projectile is zero.

          The momentum of the projectile is zero.

3   n the absence of air resistance, a stone is thrown from   and follows a parabolic path in which
      the highest point reached is   .   he stone reaches point   ust before landing.

     T

     P   Q

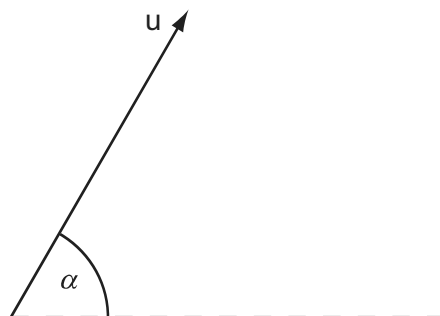   he vertical component of acceleration of the stone is

     A   zero at   .

          greatest at   .

          greatest at   .

          the same at   as at   .

Projectiles

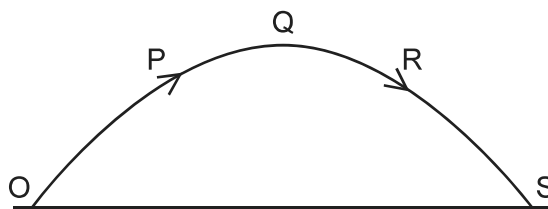4   A projectile is fired at an angle α to the horizontal at a speed u, as shown.

What are the vertical and horizontal components of its velocity after a time t?
Assume that air resistance is negligible.   he acceleration of free fall is g.

	vertical component	horizontal component
A	u sin α	u cos α
	u sin α gt	u cos α gt
	u sin α gt	u cos α
	u cos α	u sin α gt

5   A projectile is launched at point   and follows the path   , as shown. Air resistance may be
     neglected.

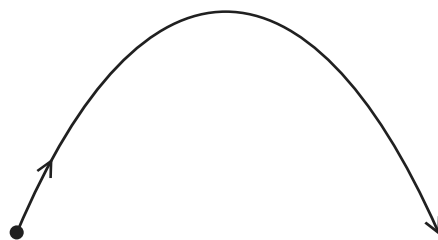

Which statement is true for the projectile when it is at the highest point   of its path?

A   he horizontal component of the projectile s acceleration is zero.

     he horizontal component of the projectile s velocity is zero.

     he kinetic energy of the projectile is zero.

     he momentum of the projectile is zero.

Projectiles

6   A stone is thrown upwards and follows a curved path.

Air resistance is negligible.

Why does the path have this shape?

A   he stone has a constant horizontal velocity and constant vertical acceleration.

        he stone has a constant horizontal acceleration and constant vertical velocity.

        he stone has a constant upward acceleration followed by a constant downward acceleration.

        he stone has a constant upward velocity followed by a constant downward velocity.

7   he diagram shows the path of a golf ball.
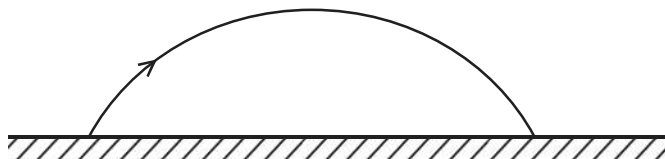
Which row describes changes in the horizontal and vertical components of the golf ball s velocity, when air resistance forces are ignored?

	horizontal	vertical
A	constant deceleration	constant acceleration downwards
	constant deceleration	acceleration decreases upwards then increases downwards
	constant velocity	constant acceleration downwards
	constant velocity	acceleration decreases upwards then increases downwards

8   A cannon fires a cannonball with an initial speed v at an angle α to the horizontal.
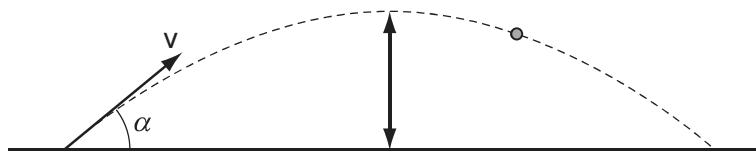
Which e uation is correct for the ma imum height   reached?

A $\dfrac{v\sin\alpha}{2g}$ $\dfrac{g\sin\alpha}{2v}$ $\dfrac{v\sin\alpha^{\,2}}{2g}$ $\dfrac{g^2\sin\alpha}{2v}$

Projectiles

9   A ball is thrown horizontally in still air from the top of a very tall building.   he ball is affected by air
     resistance.   9 02 11   N 10/Q7

     What happens to the horizontal and to the vertical components of the ball s velocity?

	horizontal component of velocity	vertical component of velocity
A	decreases to zero	increases at a constant rate
	decreases to zero	increases to a constant value
	remains constant	increases at a constant rate
	remains constant	increases to a constant value

10   A stone is pro ected horizontally in a vacuum and moves along the path shown.   9702 01/O/N/05/Q11

path of stone
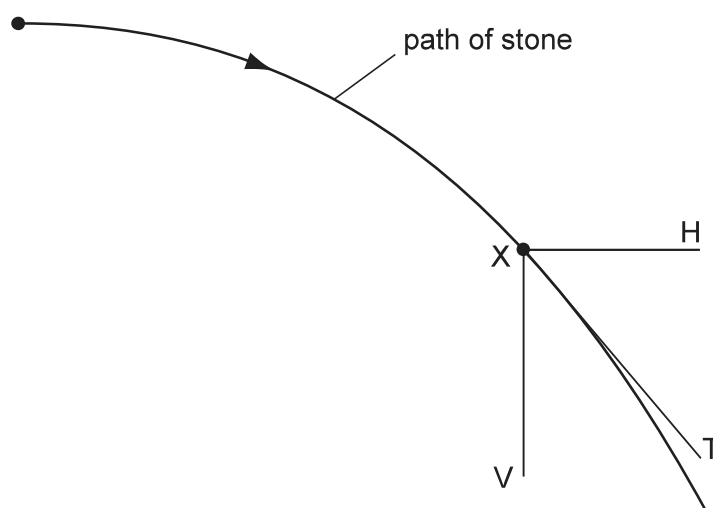
     is a point on this path.   and   are vertical and horizontal lines respectively through   .   is
     the tangent to the path at   .

     Along which directions do forces act on the stone at   ?

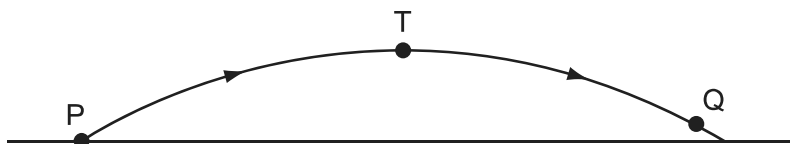   A   only   only   and   only

11   A pro ectile is launched at   5 to the horizontal with initial kinetic energy   .   9 02 11   N 1 /Q16

     Assuming air resistance to be negligible, what will be the kinetic energy of the pro ectile when it
     reaches its highest point?

     A   0.50   0. 1   0.

Projectiles

12 n the absence of air resistance, a stone is thrown from   and follows a parabolic path in which the highest point reached is   .   he stone reaches point   ust before landing.   9 02 11   12/Q9
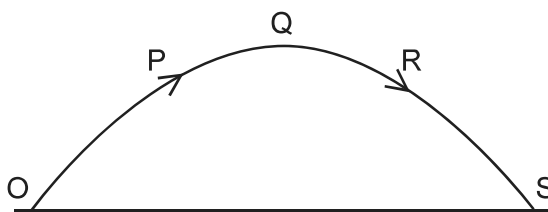

he vertical component of acceleration of the stone is

A   zero at   .

     larger at   than at   .

     larger at   than at   .

     the same at   as at   .

13 A pro ectile is launched at point   and follows the path   , as shown. Air resistance may be neglected.   9 02 12   12/Q10
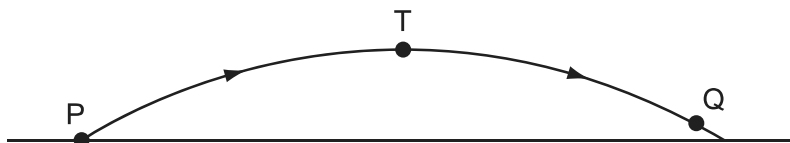

Which statement is true for the pro ectile when it is at the highest point   of its path?

A   he horizontal component of the pro ectile s acceleration is zero.

     he horizontal component of the pro ectile s velocity is zero.

     he kinetic energy of the pro ectile is zero.

     he momentum of the pro ectile is zero.

14 n the absence of air resistance, a stone is thrown from   and follows a parabolic path in which the highest point reached is   .   he stone reaches point   ust before landing.   9 02 13   12/Q8
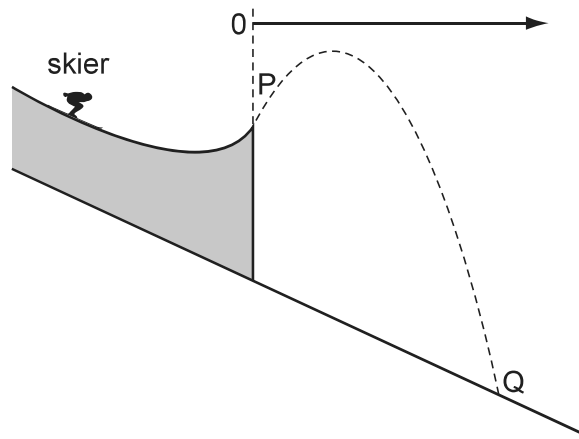

he vertical component of acceleration of the stone is

A   zero at   .

     larger at   than at   .

     larger at   than at   .

     the same at   as at   .

Projectiles

15   he dotted line shows the path of a competitor in a ski- umping competition.
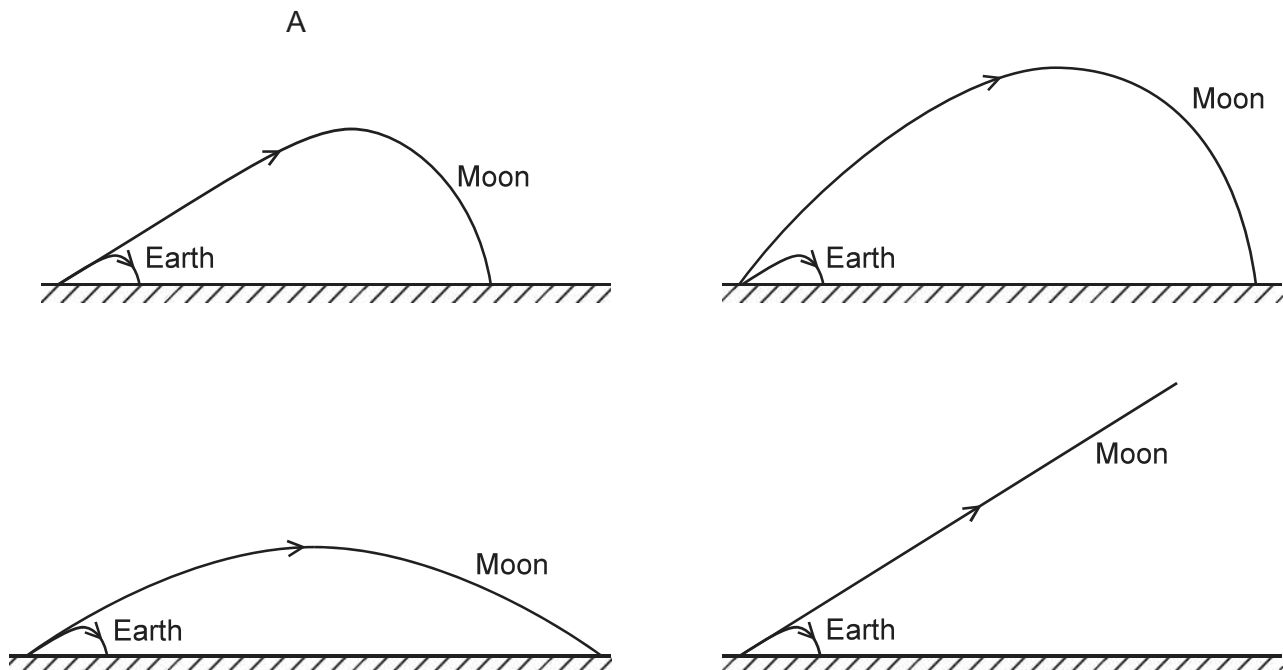

   gnoring air resistance, which graph best represents the variation of his speed v with the horizontal distance   covered from the start of his ump at   before landing at   ?

A
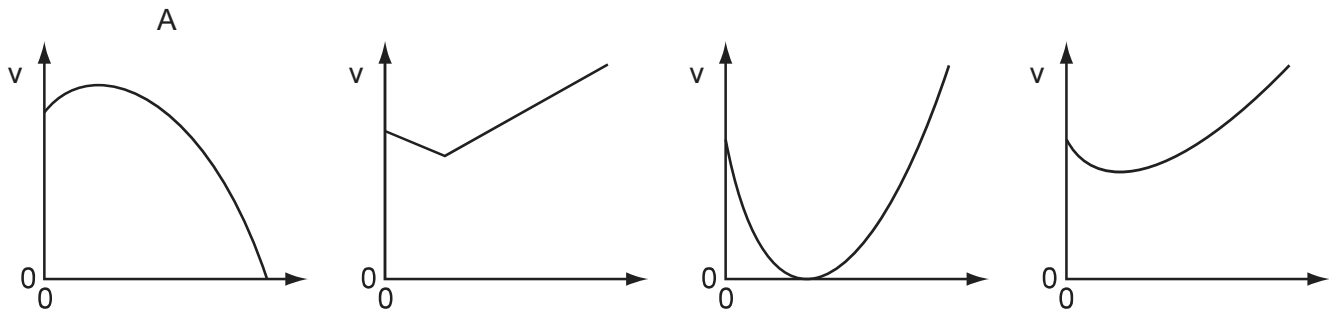
16   A golf ball is hit with the same force and direction on the   arth and on the   oon.

   Which diagram best represents the shapes of the paths taken by the golf ball?

A

Projectiles

17 A tennis ball is thrown horizontally in air from the top of a tall building.   9 02 11   1 /Q6

   f the effect of air resistance is not negligible, what happens to the horizontal and vertical components of the ball s velocity?

	horizontal component of velocity	vertical component of velocity
A	constant	constant
	constant	increases at a constant rate
	decreases to zero	increases at a constant rate
	decreases to zero	increases to a ma imum value

18 A double-ended launching device fires two identical steel balls   and   at e actly the same time. he diagram shows the initial velocities of the balls. hey are both launched horizontally, but has greater speed.   9 02 13   13/Q7

launching device
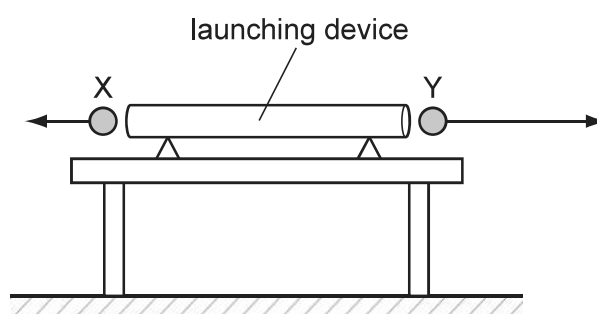
Which statement e plains what an observer would see?

A   oth   and   reach the ground simultaneously, because air resistance will cause both to have the same final speed.

   oth   and   reach the ground simultaneously, because gravitational acceleration is the same for both.

      reaches the ground before   , because   lands nearer to the launcher.

      reaches the ground before   , because   has greater initial speed.

19 An ob ect in air is thrown upwards and towards the left.   9 02 11   N 13/Q12

   Which diagram shows the force s acting on the body when it is at its highest point?

A

Projectiles
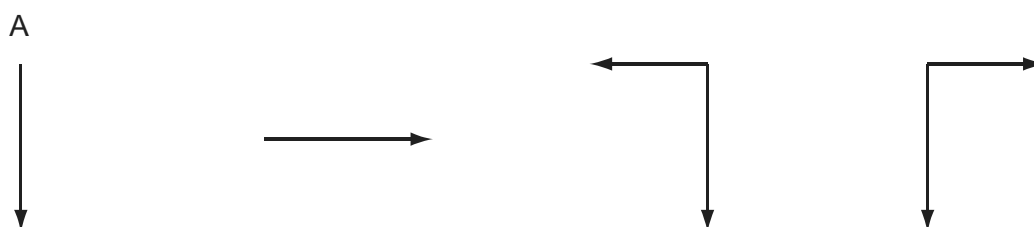
20 An astronaut throws a stone with a horizontal velocity near to the   oon s surface.   9 02 12   15/Q12

Which row describes the horizontal and vertical forces acting on the stone after release?

	horizontal force	vertical force
A	constant	constant
	constant	decreasing
	zero	constant
	zero	decreasing

21 A stone is thrown horizontally from the top of a cliff. Air resistance is negligible.   9 02 12   15/Q8

Which graph shows the variation with time of the vertical component of the stone s velocity?

A

Projectiles