

1

A golf ball was hit from the surface of the Moon. The time of flight was 4.0 s.

What is the best estimate for the maximum height reached by the ball?

[1 mark]

acceleration due to gravity on the Moon =  $1.6 \text{ m s}^{-2}$

**A**      3 m      ☐

**B**      15 m      ☐

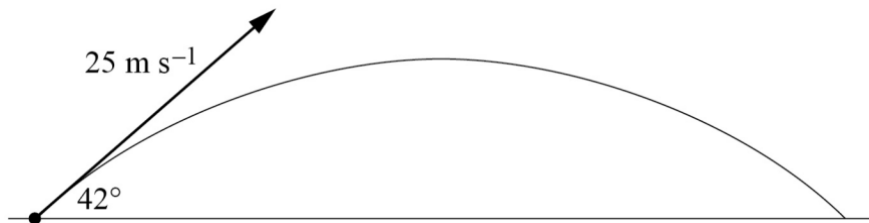
**C**      40 m      ☐

**D**      80 m      ☐

☐

- 2 **Figure 12** shows the path of a projectile launched from ground level with a speed of  $25 \text{ m s}^{-1}$  at an angle of  $42^\circ$  to the horizontal.

**Figure 12**



What is the horizontal distance from the starting point of the projectile when it hits the ground?

**[1 mark]**

**A** 23 m

**B** 32 m

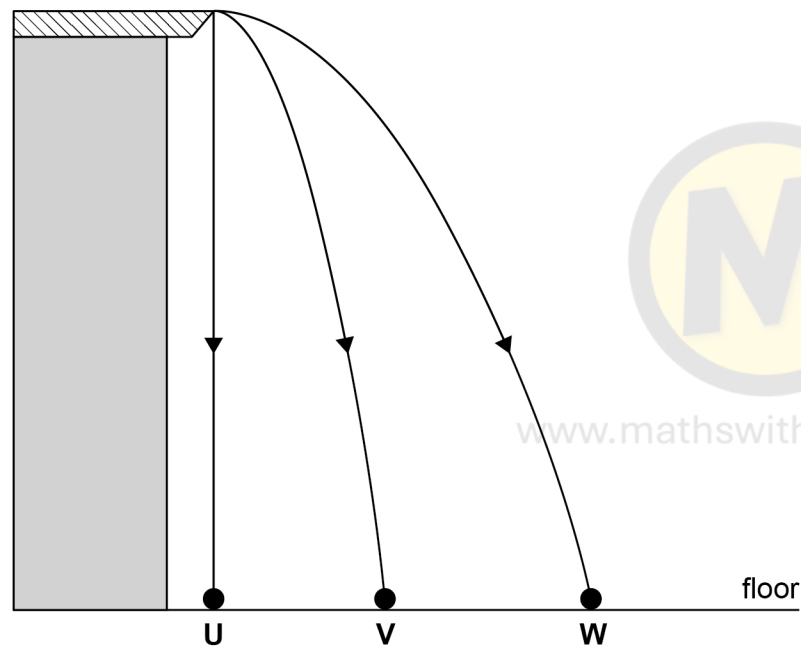
**C** 47 m

**D** 63 m



Three objects **U**, **V** and **W** leave the edge of a bench at the same time.  
The objects fall in the same vertical plane with negligible air resistance.  
**U** is released from rest so that it falls vertically.  
**V** and **W** are projected horizontally.

The paths of the three objects are shown.



Which statement is correct?

[1 mark]

**A** **U** hits the floor before **V** and **W**.

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**B** **W** hits the floor before **V**.

☐

**C** **W** hits the floor with the greatest speed.

☐

**D** **U** hits the floor with the greatest speed.

☐
☐

Turn over ►



- 4 Two ball bearings **X** and **Y** are projected from horizontal ground at the same time.
- X** has mass  $2m$  and is projected vertically upwards with speed  $u$ .
- Y** has mass  $m$  and is projected at  $30^\circ$  to the horizontal with speed  $2u$ .
- Air resistance is negligible.
- Which statement is correct?

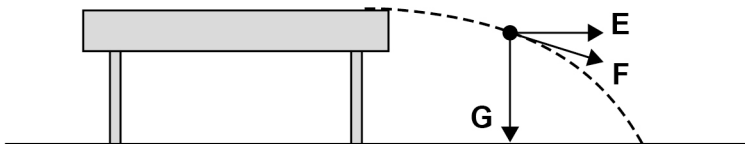
[1 mark]

- A** **X** and **Y** have the same initial momentum.
- B** **X** and **Y** reach their maximum heights at different times.
- C** The maximum height reached by **Y** is half that reached by **X**.
- D** **X** and **Y** reach the ground at the same time.

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5

A coin is projected horizontally from the top of a desk.  
The diagram shows the coin at one point in its path. The air resistance is negligible.



The arrows **E**, **F** and **G** represent different directions.

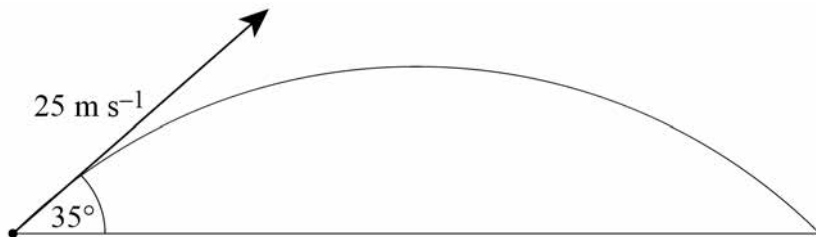
Which row gives the direction of the acceleration and the direction of the momentum of the coin at this point?

[1 mark]

|          | Acceleration | Momentum |
|----------|--------------|----------|
| <b>A</b> | <b>F</b>     | <b>F</b> |
| <b>B</b> | <b>F</b>     | <b>E</b> |
| <b>C</b> | <b>G</b>     | <b>F</b> |
| <b>D</b> | <b>G</b>     | <b>E</b> |



- 6 A projectile is launched with a speed of  $25 \text{ m s}^{-1}$  at an angle of  $35^\circ$  to the horizontal, as shown in the diagram.



Air resistance is negligible.

What is the time taken for the projectile to return to the ground?

[1 mark]

- A** 1.5 s  
**B** 2.1 s  
**C** 2.9 s  
**D** 4.2 s

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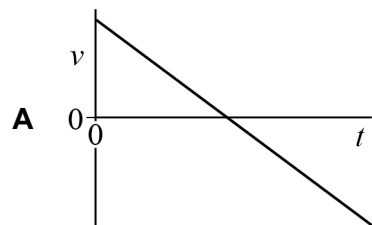
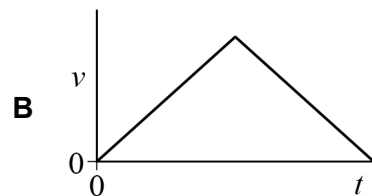
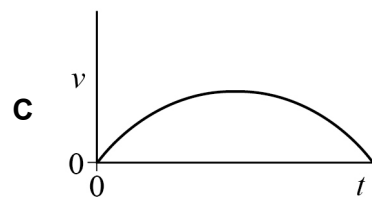
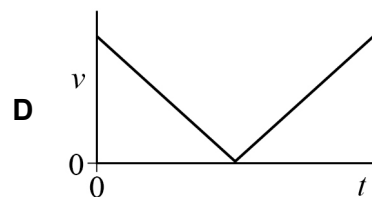
7

A girl kicks a football vertically upwards at time  $t = 0$

Air resistance is negligible.

What is the variation of the vertical component of velocity  $v$  of the football with  $t$  until it reaches the ground?

[1 mark]

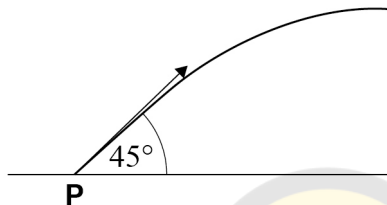

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8

A ball is kicked from point **P** on level ground. The ball initially travels at  $45^\circ$  to the horizontal.

The ball reaches its maximum height after a time of 2.0 s.

Air resistance can be ignored.



What is the displacement of the ball from **P** when at its maximum height?

[1 mark]

**A** 20 m

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**B** 40 m

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**C** 45 m

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**D** 60 m

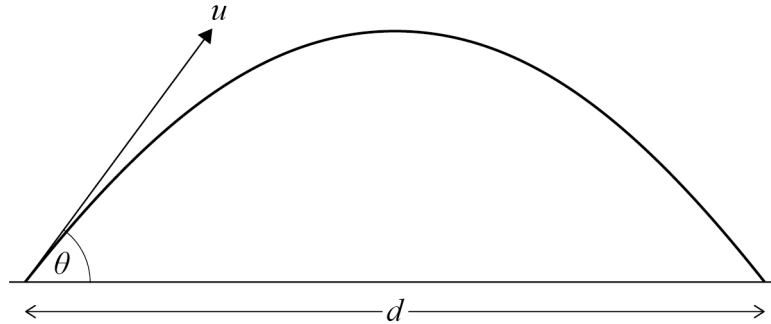
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9

A projectile is fired from ground level over horizontal ground.

Its initial velocity is  $u$  at an angle  $\theta$  to the horizontal.

The range of the projectile is  $d$ .



A second projectile is fired with a velocity  $2u$  at the same angle.

What is the range of this projectile?

Assume that air resistance is negligible.

[1 mark]

A  $\sqrt{2}d$

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B  $2d$

☐
☐

C  $2\sqrt{2}d$

☐

D  $4d$

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