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| **Crack the Code** | **Vertical Motion Under Gravity** |

In all questions, use the acceleration due to gravity as and assume that the object can be modelled as a particle.

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| **A** | A stone is dropped from the top of a cliff. The stone takes seconds to reach the sea at the bottom of the cliff. Find the height of the cliff. | **B** | A ball is dropped from a height of metres above the ground. Find the time taken for the ball to reach the ground. |
| **C** | An apple is projected vertically downward with a velocity of . The apple travels metres before hitting the ground. Find the velocity of the apple as it hits the ground. | **D** | A tennis ball is thrown vertically upward from the ground with a velocity of . Find the maximum height above ground that the ball reaches. |
| **E** | A pebble is projected vertically upwards. It reaches its maximum height seconds later. Find the initial velocity of the pebble. | **F** | A particle is projected vertically upwards with a velocity of . Three seconds later the particle is moving downwards with a velocity of . Find the value of . |
| **G** | A stone is projected upwards from a height of metres. It reaches the ground seconds later. Find the initial velocity of the stone. | **H** | A ball is projected upwards from a height of m above the ground with an initial velocity of Find the time taken for the ball to hit the ground. |
| **I** | A ball is projected vertically upwards from a height m above the ground, with a velocity of . It reaches the ground seconds later. Find the total distance travelled by the ball. | **J** | Particle A is dropped from a height m. At the same time, particle B is projected upwards from height with a velocity of . They both hit the ground at the same time. Find height. |
| Round all answers to 1 decimal place. To get the three-digit code, add all your answers together then round to the nearest integer. | | | |