

## Chapter 1 Projectile motion. Revision Questions page 61-63 – Multiple Choice Answers

Q	Ans	Explanation
1	A	The object starts off at $+20 \text{ m s}^{-1}$ which implies it is moving upwards (+ direction) and then after a time it has zero speed and then starts to get speed in the negative direction. This is just an object thrown upwards. It is not horizontal velocity as it is zero speed at one point which doesn't happen with horizontal velocity
2	B	Height is a measure of the displacement in the y-direction ( $s_y$ ). The relationship for $s_y$ and $t$ is given by: $s_y = u_y t + \frac{1}{2} g t^2$ <i>but</i> $u_y = 0$ $s_y = \frac{1}{2} g t^2$ $s_y = -4.9 t^2$ (take out the constant of 4.9) $-s_y \propto t^2$ $t \propto \sqrt{-s_y}$ $t \propto \sqrt{h}$ (recall that $h$ is a scalar quantity and will be equal to $-s_y$ )
3	B	Acceleration always equals $-9.8 \text{ m s}^{-2}$ in free fall. It always points downwards (negative direction) because that is the direction of the net force).
4	A	Most students say 'range' but this is not so. Range increases as the angle of elevation increases but only up to $45^\circ$ . After that (from $45$ to $90^\circ$ ) the range gets less. However, the time of flight increases up to $45^\circ$ and keeps increasing because it has a higher and higher vertical height. Answer A.
5	B	The time of flight depends only on the vertical displacement so that will stay at $t$ . Because it has twice the horizontal speed (new speed = $2v_x$ ) it will have twice the range ( $s_x = u_x t$ ), or $2R$ .

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