Higher Projectile Motion Answers

1. a) Horizontal component and the vertical component.

b) Horizontal component = 0 and the vertical component = $9.8ms^{-2}$.

2. a) $V_v = -4.9\ ms^{-1}$. ($4.9\ ms^{-1}$ downwards)

b) $V_H = 0ms^{-1}$.

3. a) t = 1.22s.

b) $S_v = 7.35m$.

4. a) $V_v = -31.1ms^{-1}$.

b) $S_v = 48.4m$.

5. a) t = 1.15s.

b) $V_H = 3.65ms^{-1}$.

6. $V_H = 8ms^{-1}$.

7. Sv = 122.5m.

8. Sv = 137.5m.

9. $V_R = 50ms^{-1}$ @ 127°.

10. a) $V_H = 15ms^{-1}$.

b) $V_v = -35.3ms^{-1}$.

c) Sv = 63.5m.

d) $S_H = 54m$.

11. t = 0.51s.

12. a) i) $U_v = 8.45ms^{-1}$.

ii) $U_H = 18ms^{-1}$.

b) Sv = 3.64m.

c) $S_H = 31.1m$.

13. $S_H = 35m$.

14. a) $V_H = 12ms^{-1}$.

b) $S_H = 312m$.

15. a) i) $U_H = 3.5ms^{-1}$.

ii) $U_v = 6.06ms^{-1}$.

b) Use the horizontal equation for displacement to show that **t = 0.8s**.

c) h = 1.71m.

d) The kinetic energy of the coin is less when it enters the dish.

As the coin moves from the hand to the dish the kinetic energy is gradually converted into gravitational potential energy and so its vertical speed decreases.

16. a) i) $U_v = 4.1ms^{-1}$. ($v^2 = u^2 + 2as$)

ii) $V_H = 9.33ms^{-1}$.

b) If the maximum height is less than 0.86m then he had less time to complete the jump.

The horizontal velocity must have been greater to ensure that he covered the 7.8m.

17. a) i) $U_H = 4.2ms^{-1}$.

ii) $U_v = 5.0ms^{-1}$.

b) t = 0.69s.

c) height, h = 3.4m.

d) **The ball would not land in the basket.**

The initial vertical speed would increase so the ball is higher than the basket when it has travelled 2.9m horizontally.

18. a) U_H= 5.75 ms^{-1} and Uv= 4.82 ms^{-1}.

b) V_H = 5.75 ms^{-1} and V_v = -10.86 ms^{-1} (down).

c) Resultant Velocity = 12.3 ms^{-1} @152°.

19. a) i) $U_H = 33.7ms^{-1}$.

ii) $U_v = 24.5ms^{-1}$.

b) OP = 2.5s + PQ = 2s => Total = 4.5s.

c) S_H = 151.7m.

20. a) i) $U_v = 4.6ms^{-1}$.

ii) $U_H = 3.86ms^{-1}$.

b) i) t = 0.52s.

ii) Sv = 1.07m.

The ball will travel over the net with a clearance of 0.17m.