1. A projectile is launched with speed u at an angle θ to the horizontal. Its horizontal and vertical components of the initial velocity are:
   A. $u_x = u\sin\theta$, $u_y = u\cos\theta$
   B. $u_x = u\cos\theta$, $u_y = u\sin\theta$
   C. $u_x = u\tan\theta$, $u_y = u\cot\theta$
   D. $u_x = u$, $u_y = 0$ (B)

Explanation : With θ from horizontal: $u_x = u\cos\theta$, $u_y = u\sin\theta$.

2. For the same launch and landing height, the time of flight T is:
   A. $u\sin\theta / g$ B. $u\cos\theta / g$
   C. $2u\sin\theta / g$ D. $2u\cos\theta / g$ (C)

Explanation : Time of flight is $T = 2u\sin\theta / g$.

3. The maximum height H (for level ground) equals:
   A. $u^2\sin^2\theta / (2g)$ B. $u^2\cos^2\theta / (2g)$
   C. $u^2\sin 2\theta / g$ D. $u\sin\theta / g$ (D)

Explanation : $H = u^2\sin^2\theta / (2g)$.

4. The horizontal range R on level ground is:
   A. $u^2\sin^2\theta / g$ B. $u^2\sin 2\theta / g$
   C. $2u\sin\theta / g$ D. $u^2 / (2g)$ (B)

Explanation : $R = u^2\sin 2\theta / g$.

5. Which statement is true for level-ground projectile motion (same launch and landing height)?
   A. Maximum range occurs at $\theta = 30°$
   B. Complementary angles θ and $90°-\theta$ give different ranges
   C. Maximum range occurs at $\theta = 45°$
   D. Range is independent of angle (C)

Explanation : $R \propto \sin 2\theta$, max at $\theta = 45°$

6. The trajectory equation (eliminating t) is:
   A. $y = x\tan\theta + (g x^2) / (2u^2\cos^2\theta)$
   B. $y = x\tan\theta - (g x^2) / (2u^2\cos^2\theta)$
   C. $y = x\cot\theta - (g x^2) / (2u^2\sin^2\theta)$
   D. $y = x\tan\theta$ (B)

Explanation : Trajectory is parabolic: $y = x\tan\theta - (g x^2)/(2u^2\cos^2\theta)$.

7. Useful identity linking angle, height, and range:
   A. $\tan\theta = R / 4H$
   B. $\tan\theta = 4H / R$
   C. $\tan\theta = 2R / (gT^2)$
   D. $\tan\theta = g / (2R)$ (B)

Explanation : Relation: $\tan\theta = 4H / R$.

8. Another identity valid for level-ground projectile motion is:
   A. $4H = gT^2$ B. $8H = gT^2$
   C. $H = gT$
   D. $T = H / g$ (B)

Explanation : By eliminating $u\sin\theta$: $8H = gT^2$

9. For $u = 28$ m/s and $\theta = 30°$ ($g = 9.8$ m/s^2), the horizontal range R is closest to:
   A. 6.9 m B. 69.3 m
   C. 69.3 m D. 96.0 m (D)

Explanation : $R = (u^2\sin 60°)/g \approx 69.3$ m.

10. Which set is all correct for $\theta = 45°$ on level ground?
   A. $R = u^2/g$, $H = R/2$
   B. $R = u^2/g$, $H = R/4$
   C. $R = u^2/(2g)$, $H = R/4$
   D. $R = u^2/g$, $H = R/8$ (B)

Explanation : At 45°, $R = u^2/g$ and $H = R/4$.