**Physics by Saleem Sir**

DPP: 4

Motion in a Plane

Q1 A ball is thrown at an angle θ with the horizontal. Its kinetic energy is 100 J and it becomes 30 J at the highest point. The angle of projection is ;

(A) $45°$

(B) $30°$

(C) $\cos^{-1}\left(\frac{3}{10}\right)$

(D) $\cos^{-1}\left(\sqrt{\frac{3}{10}}\right)$

Q2 Three projectiles A, B and C are thrown from the same point in the same plane. Their trajectories are shown in the figure. Which of the following statement is true ?
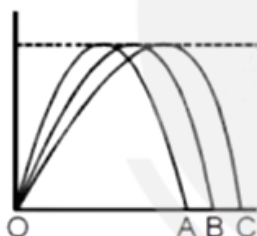

(A) The time of flight is the same for all the three

(B) The launch speed is largest for particle C

(C) The horizontal velocity component is largest for particle C

(D) All of the above

Q3 Trajectories of two projectiles are shown in the figure. Let T_1 and T_2 be the time periods and u_1 and u_2 be their speeds of projection. Then
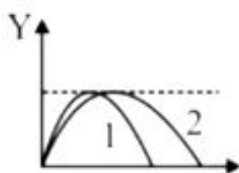
(A) $T_2 > T_1$

(B) $T_1 > T_2$

(C) $u_1 > u_2$

(D) $u_1 < u_2$

Q4 Rank the launch angles for the five paths in the figure below with respect to time of flight, from the shortest time of flight to the longest
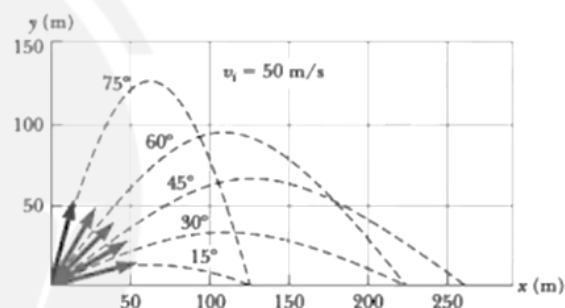
(A) $15°, 30°, 45°, 60°, 75°$

(B) $75°, 60°, 45°, 30°, 15°$

(C) $15°, 75°, 30°, 60°, 45°$

(D) $30°, 60°, 15°, 45°, 75°$

Q5 The velocity at the maximum height of a projectile is $\frac{\sqrt{3}}{2}$ times its initial velocity of projection (u). Its range on the horizontal plane is

(A) $\frac{\sqrt{3}u^2}{2g}$

(B) $\frac{3u^2}{2g}$

(C) $\frac{3u^2}{g}$

(D) $\frac{u^2}{2g}$

Q6 For an object projected from ground with speed u, horizontal range is two times the maximum height attained by it. The horizontal range of object is

(A) $\frac{2u^2}{3g}$

(B) $\frac{3u^2}{4g}$

(C) $\frac{3u^2}{2g}$

(D) $\frac{4u^2}{5g}$

Q7 Two objects are thrown up at angles of $45°$ and $60°$ respectively, with the horizontal. If both objects attain same vertical height, then the ratio of magnitude of velocities with which these are projected is ;

(A) $\sqrt{\frac{5}{3}}$

(B) $\sqrt{\frac{3}{5}}$

(C) $\sqrt{\frac{2}{3}}$

(D) $\sqrt{\frac{3}{2}}$

Q8 The angle of projection of a body is $15°$. The other angle for which the range is the same as the first one is equal to

(A) $30°$

(B) $45°$

(C) $60°$

(D) $75°$

Q9 A bullet is fired horizontally from a rifle at a distant target. Ignoring the effect of air resistance, which of the following is correct?
Horizontal Acceleration, Vertical Acceleration

(A) $10 \text{ ms}^{-2} \quad 10 \text{ ms}^{-2}$

(B) $10 \text{ ms}^{-2} \quad 0 \text{ ms}^{-2}$

(C) $0 \text{ ms}^{-2} \quad 10 \text{ ms}^{-2}$

(D) $0 \text{ ms}^{-2} \quad 0 \text{ ms}^{-2}$

Q10 If the initial velocity of a projectile be doubled, keeping the angle of projection same, the maximum height reached by it will

(A) Remain the same

(B) Be doubled

(C) Be quadrupled

(D) Be halved

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Answer Key

Q1	(D)		**Q6**	(D)
Q2	(D)		**Q7**	(D)
Q3	(D)		**Q8**	(D)
Q4	(A)		**Q9**	(C)
Q5	(A)		**Q10**	(C)

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