**DPP - 2**

Q.1 If the initial velocity in horizontal direction of a projectile is unit vector $\hat{\imath}$ and the equation of trajectory is $y = 5x(1 - x)$. The y component vector of the initial velocity is (Take $g = 10$ m/s^2)

Q.2 A ball of mass m is thrown vertically upward. Another ball of mass 2m is thrown at an angle θ with the vertical. Both the balls stay in air for the same period of time. The ratio of the heights attained by the two balls respectively is $\frac{1}{x}$. The value of x is

Q.3 A body is projected from the ground at an angle of 45° with the horizontal. Its velocity after 2 s is 20 m s^{-1}. The maximum height reached by the body during its motion is m. (Use $g = 10$ m s^{-2}).

Q.4 Find the range of velocity u so that ball will fall in water
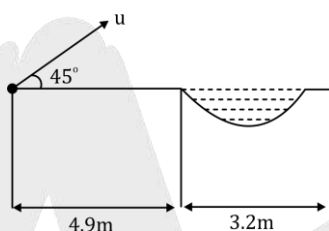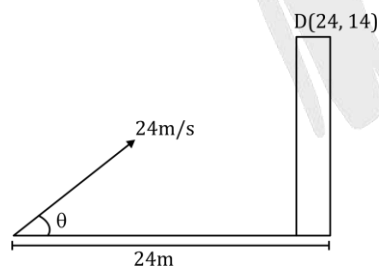

(A) $7 < u < 9$ (B) $5 < u < 7$ (C) $7 < u < 10$ (D) N.O.T

Q.5 find the number of vessel in which particle will fall
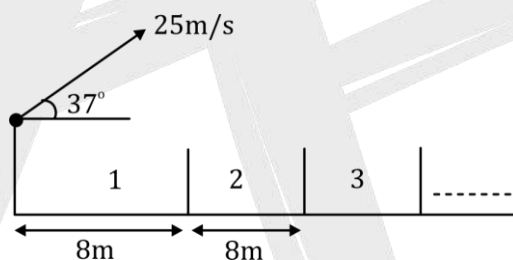
(A) 6   (B) 7   (C) 8   (D) 9

Q.6 Find angle θ so that particle hits the building at point p.

(A) $\tan^{-1}\left(\frac{19}{5}\right)$ (B) 45°

(C) 37°   (D) $\tan^{-1}\left(\frac{5}{19}\right)$

Q.7 $y = \sqrt{3}x - 5x^2$ find angle of projection & speed of projection respectively, If point of projection is origin & x-axis is horizontal and y-axis is vertical.

(A) $\theta = 60°, u = 2$m/s   (B) $\theta = 45°$ $u = 4$m/s

(C) $\theta = 60$ $u = 4$ m/s   (D) $\theta = 45$, $u = 2$ m/s

Q.8 A projectile is projected with velocity of 25 m/s at an angle θ with the horizontal. After t seconds its inclination with horizontal becomes zero. If R represents horizontal range of the projectile, the value of θ will be $\left[\text{Use } g = 10 \text{ m s}^{-2}\right]$

(A) $\frac{1}{2}\sin^{-1}\left(\frac{5t^2}{4R}\right)$ (B) $\frac{1}{2}\sin^{-1}\left(\frac{4R}{5t^2}\right)$

(C) $\tan^{-1}\left(\frac{4t^2}{5R}\right)$ (D) $\cot^{-1}\left(\frac{R}{20t^2}\right)$

Q.9 Given below are two statements. One is labelled as Assertion A and the other is labelled as Reason $\mathbb{R}$.

Assertion A : Two identical balls A and B thrown with same velocity ' u ' at two different angles with horizontal attained the same range R. If A and B reached the maximum height h_1 and h_2 respectively, then $R = 4\sqrt{h_1 h_2}$

Reason R : Product of said heights.

$$h_1 h_2 = \left(\frac{u^2\sin^2\theta}{2g}\right)\cdot\left(\frac{u^2\cos^2\theta}{2g}\right)$$

Choose the correct answer :

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is NOT the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

Q.10 A projectile is launched at an angle ' α ' with a horizontal with velocity 20 m s^{-1}. After 10 s, its inclination with horizontal is ' β '. The value of $\tan\beta$ will be ($g = 10$ m s^{-2})

(A) $\tan\alpha + 5\sec\alpha$ (B) $\tan\alpha - 5\sec\alpha$ (C) $2\tan\alpha - 5\sec\alpha$ (D) $2\tan\alpha + 5\sec\alpha$

Q.11 A person can throw a ball upto a maximum range of 100 m. How high above the ground he can throw the same ball?

(A) 25 m   (B) 50 m   (C) 100 m   (D) 200 m

Q.12 A helicopter is flying horizontally with a speed v at an altitude h has to drop a food packet for a man on the ground, What is the distance of helicopter from the man when the food packet is dropped?

(A) $\sqrt{\frac{2v^2 h}{g} + h^2}$

(B) $\sqrt{2ghv^2 + h^2}$
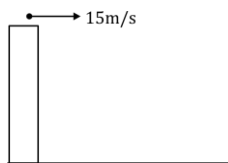
(C) $\sqrt{\frac{2gh}{v^2} + h^2}$

(D) $\sqrt{\frac{2ghv^2 + 1}{h^2}}$

[more than one option]

**Q.13** A particle through from building with horizontal speed 15 m/s. Shown in figure.

(A) Time of flight is 4sec

(B) Horizontal range is 60 m.

(C) Angle blew $\vec{v}$ & horizontal just before collision is $\tan^{-1}(8/3)$

(D) Distance b/w point of projection & point of collision is 100 m.

Q.14 In given figure choose correct option.

(A) Time to reach maximum height is 5sec.

(B) Time of flight is 12sec

(C) Horizontal range is 600 m

(D)time when particle make 45° with horizontal is 10sec.
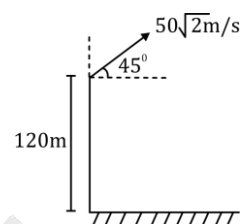
Q.15 particle is projected from building shown in figure choose correct
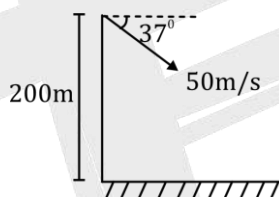
(A) Time of flight is 4 sec.

(B) Horizontal distance travelled by particle i. 160 m

(C) angle of collision with horizontal is $\tan^{-1}\left(\frac{7}{4}\right)$

(D) All option is correct.

Nishant Jindal

ANSWER KEY

1.	5	**2.**	1	**3.**	20	**4.**	(A)	**5.**	(C)	**6.**	(A)	**7.**	(A)
8.	(D)	**9.**	(A)	**10.**	(B)	**11.**	(B)	**12.**	(A)	**13.**	(A, B, C, D)		
14.	(A, B, C, D)	**15.**	(A,B,C,D)										