	INDIAN SCHOOL AL WADI AL KABIR	
Class: XI	**Department: SCIENCE 2021 – 22** **SUBJECT : PHYSICS**	**Date of submission:** **10.06.2021**
Worksheet No:02 **WITH HINTS**	**Topic: MOTION IN A PLANE**	**Note:** **A4 FILE FORMAT**
NAME OF THE STUDENT	**CLASS /SECTION**	**ROLL NO.**

OBJECTIVE TYPE QUESTIONS

[1] Two projectiles A B are thrown from the same point with the same speed of 30m/s at angles of projection 50° and θ respectively , so that both the projectiles having the same range. Then the angle θ is
[a] 45^0 [b.] 40^0 [c] 50^0 [d] 50^0

[2] The range of a projectile, when launched at an angle of 15° with horizontal is 1.5km. What is the range of the projectile, when launched at an angle of 45° to the horizontal?

[a] 4km[b] 5km [c] 3.5 km[d] 3km

[3] If the muzzle velocity of the shell is 400m/s, the Maximum range of a gun along horizontal is
 [a] 4km [b.]16 km   [c] 8km [d] 20km

[4] The angular speed of a fly-wheel making 120 r.p.m is

[a] 4π rad/s   [b] π rad/s   [c] 2πrad/s   [d] $4\pi^2$ rad/s

[5] A body is whirled in a horizontal circle of radius 20cm. It has an angular velocity of 10 rad/s. What is the linear velocity at any point on the circular path?

[a]10m/s   [b] 20 m/s   [c] $\sqrt{2}$ m/s[d] 2 m/s

Very Short answer type questions (1marks)

[6] Name the only force acting on a projectile, when it is projected into the atmosphere?

[7] A ball is thrown in a parabolic path. Is there any point at which the acceleration is perpendicular to the velocity ?

[8] A ball 'A' is dropped from the top a tower and another ball 'B' is projected horizontally from the same point. Which ball will reach the ground first ?

[9]What is the angle between the velocity vector and acc. vector in uniform circular motion ?

[10] Two bullets A and B are fired horizontally with different velocities ,U_A and U_B respectively .If U_A is greater than U_B, which will reach the ground first. why?

Answer Key
[6] force due to gravity
[7]maximum height
[8] both at same time
[9]90
[10] both at same time

Short answer type questions (2 marks)

[11] A boy is moving with velocity 3km/h along east and the rain is falling vertically with velocity 4km/hr. Calculate the velocity of rain relative to boy [take tan 37° =0.75]

Apply triangle law of vector addition   and use the formula $Tan\theta = \frac{opp}{adj}$

[12]Show that when the horizontal range is maximum, height attained by the body is one fourth the maximum range in the projectile motion.

$R_{max} = \frac{u^2}{g}$ $H = \frac{u^2 sin_\theta^2}{2g}$;

For $\theta=45°$ $H = \frac{u^2}{4g} = \frac{1}{4}$of the Rmax.

[13] A cricket ball is thrown at a speed of 28m/s in a direction 30^0 above the horizontal. [i]Maximum height[ii] time of flight[iii] time taken to reach maximum height[iv] horizontal range.

[i] $H = \dfrac{u^2 sin_\theta^2}{2g}$ [ii] $\dfrac{2u sin\theta}{g}$ [iii] $\dfrac{u sin\theta}{g}$ [iv] $\dfrac{u^2 sin2\theta}{g}$

Ans-10m, 5.8s, 2.9s,69.3m

Long answer question (3 marks)

[14] What is angular velocity and angular acceleration? Establish a relation with

a) Angular velocity and linear velocity
b) Angular acceleration and linear acceleration

[15] Show that there are two angles θ_1 and θ_2 projections for the same horizontal range.

[16]An aero plane moving horizontally at 150m/s releases a bomb at a height of 500m.The bomb hits the target. what was the horizontal distance of the aero plane from the target when the bomb was released ?

Horizontal Velocity $= \dfrac{displacement}{time}$

$S = ut + \dfrac{1}{2} gt^2$

Horizontal distance $= 1500m$

Very Long answer question (5 marks)

[17] Derive an expression to find the centripetal acceleration and hence centripetal force

[18]What is centripetal acceleration and centripetal force? Derive an expression for centripetal acceleration& centripetal force.

[19] Show that the path traced by a projectile is parabola. Derive the equations to find the [i]Maximum height[ii] time of flight[iii] time taken to reach maximum height[iv] horizontal range.

[20] State the parallelogram law of vector addition. Derive an expression for magnitude and direction of resultant of the two vectors.

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