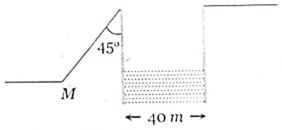
NEW STANDARD ACADEMY

Marks: 60

Date : 24-06-24 **CLASS : 11TH JEE** **Time: 3 HRS**

PHYSICS

1. Why does a tennis ball bounces more at hills
2. What is angle between velocity vector and acceleration vector in uniform circular motion?
3. A particle moves with a constant speed but in constantly varying direction. The path of particle will be?
4. The speed of a projectile at its maximum height is half of its initial speed. The angle of projection is?
5. Two second after projection, a projectile is travelling in a direction inclined at 30^0 to the horizontal, after one more sec, it is travelling horizontally the magnitude and direction of its velocity are?
6. A body is projected up a smooth inclined plane (length =$20\sqrt{2}$ m) with velocity u from the point M as shown in the figure. The angle of inclination is 45^0 and the top is connected to a well of diameter 40m. If the body just manages to cross the well, what is the value of u



7. A cricketer can throw a ball to a maximum horizontal distance of 100 m. How much high above the ground can the cricketer throw the same ball?
8. A particle moves along a semicircle of radius 10 m in 5 seconds. The average velocity of the particle is ?
9. A ball is dropped downwards. After 1 second another ball is dropped downwards from the same point.What is the distance between them after 3 second?
10. A body freely falling from the rest has a velocity v after it falls through a height h.The distance it has to fall down for its velocity to become double,is?

CHEMISTRY

1. What are sigma (σ) and pi (π) bonds?
2. What is s-p overlapping?
3. Explain sp^2 hybridisation with example
4. Explain in short, the factors affecting the formation of ionic bond.
5. Describe the characteristics of covalent compounds.
6. Write the electronic structures of PCl_5 and NH_4Cl
7. What is VSEPR theory? Explain structure of H_2O with the help of it.
8. State the role of LCAO in the molecular orbital theory
9. What is hydrogen bond? What is the reason as normal temperature water is liquid and H_2S is gas?
10. Describe the geometry of the following molecules on the basis of hybridization and VSEPR theory-
    (i) Methane
    (ii) Water
    (iii) NH_3,
    (iv) PCl_5

MATHS

1. If $\sin(x + 3\alpha) = 3\sin(\alpha - x)$ then tan x is.
2. If tan α equals the integral solution of the inequality $4x^2 - 16x + 15 < 0$ and cos β equals to the slope of the bisector of first quadrant, then $\sin(\alpha + \beta)$ $\sin(\alpha - \beta)$ is equal to
3. Prove that $\tan 70^0 - \tan 20^0 = 2 \tan 50^0$.
4. Prove that $\frac{sinx-sin3x}{sin^2x-cos^2x} = 2\sin x$.
5. Prove that $\sin47^0+\sin61^0 - \sin11^0-\sin 25^0=\cos7^0$.
6. Prove that $\frac{\sec 8\theta-1}{\sec 4\theta-1} = \frac{\tan 8\theta}{\tan 2\theta}$
7. The value of the expression
   $1 - \frac{sin^2y}{1+cosy} + \frac{1+cosy}{sin\,y} - \frac{sin\,y}{1-cos}$ is equal to

8. If $0 < x < \pi$ and $\cos x + \sin x = 1/2$ then tan x is
9. If θ lies in the second quadrant , then the value of $\sqrt{\left(\frac{1-\sin\theta}{1+\sin\theta}\right)} + \sqrt{\left(\frac{1+\sin\theta}{1-\sin\theta}\right)}$ is
10. If $\alpha = \frac{\pi}{15}$, then prove that $\cos 2\alpha \cos 4\alpha \cos 8\alpha \cos 14\alpha = \frac{1}{16}$