



# GOVIND VIDYALAYA

TAMULIA

Daily Practice Paper (DPP)

Subject-Mathematics

Practice Test

Test Module  Assignment  Practical Questions  Project

## PRACTICE PAPER ON APPLICATION OF DERIVATIVE

[4 marks question]

1. The two equal side of on isosceles  $\Delta$  with fixed base  $b$  are decreasing at the rate of  $3\text{cm/s}$ . How fast is the area decreasing when the two equal sides are equal to the base?
2. A men of height  $2\text{m}$  walks at a uniform speed of  $5\text{km/h}$  away from a lamp, past which is  $6\text{m}$  high. Find the rate at which the lengths of his shadow increase.
3. A water tank has the shape of an inverted right circular cone with its axis vertical and vertex lower most. Its semi vertical angle is  $\tan^{-1}(0.5)$ . water is poured into it at a constant rate of  $5\text{cm}^3/\text{hr}$ . Find the rate at which the level of the water is rising at the instant when the depth of water in the tank is  $4\text{m}$ .
4. Find the interval in which the function given by  $F(x) = \frac{3}{10}x^4 - \frac{4}{5}x^3 - 3x^2 + \frac{36}{5}x + 1$  is (a) Strictly increasing (b) Strictly decreasing
5. Show that  $f(x) = \tan^{-1}(\sin x + \cos x)$  is always an increasing function in  $(0, \frac{\pi}{4})$ .
6. For the curve  $y = 4x^3 - 2x^5$ , find all the point at which the tangent passes through the origin.
7. Prove that the curves  $x = y^2$  and  $xy = k$  cut at right angle if  $8k^2 = 1$

[6 marks question]

8. Find the maximum area of an isosceles  $\Delta$  inscribed in the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  with its vertex at one end of the major axis.
9. A tank with rectangular base and rectangular sides, open at the top is to be constructe so that its depth is  $2\text{m}$  and volume is  $8\text{m}^3$ . If building of tank costs Rs  $70$  per sq. metres for the base and Rs  $45$  per sq. metres for sides what is the cost of least expansive tank?
10. The sum of the perimeter of a circle and square is  $k$ , where  $K$  is some constant. Prove that the sum of their area is least when the side of square is double the radius of circle.
11. A window is the form of a rectangle surmounted by a semi circular opening the total perimeter of the window is  $10\text{m}$ . Find the dimensions of the window to admit maximum light through the whole opening.
12. A point on the hypotenuse of a triangle is at distance  $a$  and  $b$  from the sides of the triangle. Show that the minimum length of the hypotenuse is  $(a^{2/3} + b^{2/3})^{3/2}$

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