Comprehensive Test Series-02

(Application of Derivatives)
XII

TIME: 1hr.

MM: 36

General Instructions:

- All Questions are compulsory.
- Use of calculator is not permitted.

Q.1 Find the rate of change of the volume of a sphere with respect to its diameter.

Q.2 A man 2 metres high, walks at a uniform speed of 6 metres per minute away from a lamp post, 5 metres high. Find the rate at which the length of his shadow increases.

Q.3 The two equal sides of an isosceles triangle with fixed base b are decreasing at the rate of 3 cm/sec. How fast is the area decreasing when the two equal sides are equal to the base?

Q.4 If $y = x^4 - 10$ and if x changes from 2 to 1.99, what is the approximate change in y?

Q5. Use differentials to approximate the cube root of 127.

Q.6 Use differentials find the approximate value.

$$\frac{1}{(2.002)^2}$$

Q.7 Prove that the tangents to the curve $y = x^2 - 5x + 6$ at the points (2,0) and (3,0) are at right angels.

Q.8 Find the point on the curve $y = 2x^2 - 6x - 4$ at which the tangent is parallel to the x – axis.

Q.9 For the curve $y = 4x^3 - 2x^5$ find all points at which the tangent passes through the origin.

Q.10 Show the curves $x = y^2$ and $xy = k$ cut at right angles, if $8k^2 = 1$.

Q.11 Show the curves $xy = a^2$ and $x^2 + y^2 = 2a^2$ touch each other.

Q.12 Find the equations of tangent and normal to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ at (x_0, y_0)