



BS 45 (NS)

IV Semester B.Sc. (IT) Examination, June/July 2010
MATHEMATICS – II
(Freshers)

Time : 3 Hours

Max. Marks : 75

Instructions : 1) Answer *all* questions in Part – A.
2) Answer *any five* questions in Part – B.

PART – A

I. State whether **true** or **false** : **(1×5=5)**

- 1) Is it $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$
- 2) If $f(x) = x^m$ then $f'(x) = mx^{m-1}$.
- 3) $\frac{d}{dx}(e^x) = e^x$.
- 4) $\cosh^2 x - \sinh^2 x = 0$.
- 5) For a minima or maxima $\frac{dy}{dx} = 0$.

II. 1) Evaluate $\lim_{x \rightarrow 1} \frac{x^2 - 3x + 2}{x - 1}$. **(2×10=20)**

- 2) Define a continuous function with example.
- 3) Find the derivative of $y = 4x^3 + 8x^2 + x + 6$.
- 4) State intermediate value theorem.
- 5) Find the derivative of $f(x) = x^2$.
- 6) What is a point of inflection ?
- 7) Find the intervals in which $f(x) = x + \sin x$ is increasing or decreasing.

P.T.O.



- 8) At what point the function $f(x) = x^2 + 3x - 5$ attains a maximum or a minimum.
- 9) Define a cubic graph.
- 10) What approximate is $\sqrt{9.1}$?

PART – B

(5×10=50)

III. 1) By using sandwich theorem P.T. $\lim_{x \rightarrow a} \sqrt{x} = \sqrt{a}$.

2) Discuss for the continuity $f(x) = \begin{cases} x^3 + 2 & \text{if } x < 2 \\ 5 & \text{if } x = 2 \\ x^2 + 6 & \text{if } x > 2 \end{cases}$

and represent it graphically.

- 3) Explain a geometrical meaning of the Derivatives.
- 4) Use the product rule to find the derivative of $f(x) = x \cos x$. Explain step involving it.
- 5) Find the derivative of $y^2 = 4ax$ by using parametric form.
- 6) Find the local extreme of $f(x) = x^5 - 5x$.
- 7) Write the first four term of Maclaurin's series for $y = \tan x$.
- 8) Explain Newton-Raphson method.
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