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 $\lim\limits_{x \to 0} \dfrac{\sin x}{x} = 1$

2) If $f(x) = x^m$ then $f'(x) = mx^{m-1}$.

3) $\dfrac{d}{dx}(e^x) = e^x$.

4) $\cosh^2 x - \sinh^2 x = 0$.

5) For a minima or maxima $\dfrac{dy}{dx} = 0$.

II. 1) Evaluate $\lim\limits_{x \to 1} \dfrac{x^2 - 3x + 2}{x - 1}$.   **(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 $\sqrt{9.1}$?

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PART – B   (5×10=50)

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III. 1) By using sandwitch theorem P.T. $\displaystyle\lim_{x \to a} \sqrt{x} = \sqrt{a}$.

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

    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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