Roll No. 112

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B.Tech (All groups)

1st SEMESTER

SEP 2015

MID SEMESTER EXAMINATION

MA – 101 Mathematics- I

Time : 90 mins

Max. Marks: 25

Note: Attempt **All** questions. All are of equal marks. Assume missing data if any.

1 Discuss the convergence of the following infinite series

$$\sum \frac{n^2-1}{n^2+1} x^n.$$

2 Expand the function $f(x) = e^{Tan^{-1}x}$ in infinite series using Maclaurin's theorem up to 4^{th} term.

3 Show that for rectangular hyperbola $r^2 cos2\theta = a^2$. The radius of curvature at any point is given as $\rho = \frac{r^3}{a^2}$.

4 Sketch the curve and find the length of the loop of the curve

$$3ay^2 = x(x-a)^2 .$$

5 The part of parabola $y^2 = 4ax$ cut off by latus rectum revolves around the tangent at vertex. Find the volume of the reel thus generated.