DEPARTMENT OF MATHEMATICS
NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA

B.Tech. First Semester **(CE, EE, EC, ME, PI)**
Differential Calculus and Differential Equations **(MAIC-101)**

Mid Term Examination- II
M. M.: 20
Time: 9:30 a.m.- 10:20 a.m. (Shift-I)

NOTE: *Attempt all the Questions. Each Question carries 4 marks.*

Q1. Calculate the approximate value of $\sqrt{17}$ to four decimal places by taking the first four terms of an appropriate Taylor's series.

Q2. Show that the rectangular solid of maximum volume that can be inscribed in a sphere is a cube.

Q3. If $u = 2xy, v = x^2 - y^2, x = rcos\theta, y = rsin\theta$, evaluate $\frac{\partial(u,v)}{\partial(r,\theta)}$.

Q4. Solve $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 29y = 0$, given that, when $x = 0, y = 0$ and $\frac{dy}{dx} = 15$.

Q5. Solve $(D^4 + 2D^2 + 1)y = x^2 cosx$.