DEPARTMENT OF MATHEMATICS
NATIONAL INSTITUTE OF TECHNOLOGY KURUKSHETRA

B.Tech. Second Semester (**CE/EE/ECE/ME/PI**) **Mid Term – I Examination**

Integral Calculus and Difference Equations (MAIC 102) **Max. Marks**: 20 **Time**: 8:30 am – 9:20 am

Note: Answer all the questions.
Calculator is not allowed into the examination hall.

Q1. Find the singular points of $x^2(x+1)^2 y''+(x^2-1)y'+2y=0$ and also, determine the nature of the singularities. (4M)

Q2. Use Frobenius method to find series solution of $x(x-1)y''+(3x-1)y'+y=0$ about $x=0$. (8M)

Q3. Find all the eigenvalues and eigenfunctions of Sturm-Liouville boundary value problem $y''+\lambda y=0$, y(0)=y(L)=0. (4M)

Q4. Evaluate $\iint_R r^2 \sin\theta \, d\theta \, dr$, where R is the region bounded by $r=2\cos\theta$ above the initial line. (4M)