



DEPARTMENT OF MATHEMATICS
NATIONAL INSTITUTE OF TECHNOLOGY KURUKSHETRA

B.Tech. Second Semester (CE/EE/ECE/ME/PI)

Mid Term – II 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.	Using the change of variables $u = x - y, v = x + y$, evaluate the integral $\iint_R (x - y)e^{x^2 - y^2} dA$, where R is the region bounded by the lines $x + y = 1, x + y = 3$ and the curves $x^2 - y^2 = -1, x^2 - y^2 = 1$.	(6M)
Q2.	Using Gamma function, evaluate $\int_0^{\infty} x^6 e^{-4x^2} dx$.	(4M)
Q3.	Find the rate of change of $\phi = xyz$ in the direction normal to the surface $x^2 y + y^2 x + yz^2 = 3$ at the point $(1, 1, 1)$.	(4M)
Q4.	Verify Greens theorem in a plane for $\oint_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$ where C is the boundary of the region defined by $y = \sqrt{x}$ and $y = x^2$.	(6M)