J C Bose University of Science and Technology, YMCA
Department of Mathematics
Second Sessional Test – April 2024 (Semester: Second)
Subject: Mathematics II (BSC-106RAI)
B. Tech. (Robotics and Artificial Engineering)

Attempt all questions:

1. Evaluate $\int_0^{\infty}\int_x^{\infty} \frac{e^{-y}}{y}\, dy\, dx$ by changing the order of integration. [3][CO1]

2. Evaluate by Green's theorem $\int_C e^{-x}(\sin y\, dx + \cos x\, dy)$, C being the rectangle with vertices $(0,0)$, $(\pi,0)$, $(\pi, \pi/2)$ and $(0, \pi/2)$. [3][CO1]

3. Solve the equation $xp^2 - 2yp + x = 0$, where $p = \frac{dy}{dx}$. [5] [CO2]

4. Solve the differential equation $\frac{d^2y}{dx^2} + a^2y = \sec ax$, by using the method of variation of parameter. [4] [CO2]