J C Bose University of Science and Technology
Second sessional Test – November 2025 (Semester: First)
Subject: Mathematics I (BSC-103 RAI)
B. Tech. (Robotics and Artificial Engineering)

Attempt all questions:

1. Find the radius of curvature of the curve $xy^2 = a^3 - x^3$ *at* $(a,0)$ [4] [CO1]

2. A rectangular box, open at the top, is to have a volume of 32 cc. Find dimensions of the box which requires least amount of material for its construction. [5] [CO4]

3. Define Fourier series of a function. [2] [CO3]

4. Test the convergence of the series $\sum_{n=1}^{\infty} \frac{1}{n^p}$ $p > 0$. [4] [CO3]