

J.C. Bose University of Science and Technology, YMCA Faridabad

Department of Mathematics

Second Sessional Test Paper (Feb.- 2023)

Subject: Calculus and Linear Algebra (BSC-103D)

Course: B.Tech(ECE)

Time Allowed: 90 Minutes

Semester: 1st

Max. Marks: 15

Note: Attempt all the questions.

Q.1 Using L'Hospital rule, Evaluate $\lim_{x \rightarrow 0} (\cot x)^{1/\log x}$

(3)(CO-2)

Q.2 Discuss the convergence of the given infinite series:

$$1 + \frac{3}{7}x + \frac{3.6}{7.10}x^2 + \frac{3.6.9}{7.10.13}x^3 + \dots$$

(4)(CO-3)

(4)(CO-3)

Q.3 Find the half range sine series of $f(x) = x \cos x$ in $0 < x < \pi$.

(4)(CO-4)

Q.4 If $u = f(r)$, where $r^2 = x^2 + y^2$, then show that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = f''(r) + \frac{1}{r}f'(r)$.