Department of Mathematics

Internal Examination 2022

2nd Semester

CC 03

Answer any two. $5 \times 2 = 10$

1. Define Cauchy Sequence. State whether the sequence $\{n^2\}$ is a Cauchy Sequence or not. Show that $\sqrt[n]{n} \to 1$ as $n \to \infty$. $1 + 2 + 2$

2. State and prove the Sandwich Theorem. Give an example of a monotone increasing sequence. $4 + 1$

3. Test the convergence of the series $\sum \left[\frac{2.4.6.8....2n}{3.5.7.9....(2n+1)}\right]^2$ 5

4. State and prove the Cauchy root test for the convergence of an infinite series. 5

CC 04

Answer any two $5 \times 2 = 10$

1. Solve by using the method of Variation of Parameters

$$\frac{d^2y}{dx^2} - 2\frac{dy}{dx} = e^x \sin x$$

2. Solve using the method of undetermined co-efficient

$$y_2 - 2y_1 + 3y = \cos x + x^2$$

3. Solve:

$$\frac{d^2x}{dt^2} - 3x - 4y + 3 = 0$$

$$\frac{d^2y}{dt^2} + y + x + 5 = 0$$