St.JOSEPH'S COLLEGE OF ENGINEERING, CHENNAI-119

St.JOSEPH'S INSTITUTE OF TECHNOLOGY, CHENNAI-119 MA6151/ MATHEMATICS – I

ASSIGNMENT - IV

I-YEAR B.E./ B.TECH. (COMMON TO ALL BRANCHES) UNIT - II : SEQUENCE AND SERIES

PART - A

- 1. Test the series $\sum_{n=0}^{\infty} \frac{1}{3^n}$ for convergence
- 2. State Comparison tests for convergence
- 3. Using integral test, determine the convergence of $1 + \frac{1}{3} + \frac{1}{5} + \frac{1}{7} + \dots + \frac{1}{2n-1} + \dots$
- 4. Using comparison test, prove that the series $\frac{1}{1.3} + \frac{2}{3.5} + \frac{3}{5.7} + \dots$ is divergent.
- 5. Define Conditional convergence with example
- 6. Test the convergence of the series $5 4 1 + 5 4 1 + 5 4 1 + \dots$
- 7. Test the convergence of the series $\frac{1}{1.2} \frac{1}{3.4} + \frac{1}{7.8} \dots$
- 8. Prove that $\frac{\sin x}{1^3} \frac{\sin 2x}{2^3} + \frac{\sin 3x}{3^3} \dots$ converges absolutely.

PART B

- 1(a) Test the convergence of the series $\frac{6}{1.3.5} + \frac{8}{3.5.7} + \frac{10}{5.7.9} + ...$
- (b) Discuss the convergence of the series $\sum_{n=2}^{\infty} \frac{1}{n (\log n)^p}$, (p > 0)
- 2(a) Discuss the convergence and divergence of the series $\sum_{n=1}^{\infty} \frac{1.3.5...(2\,\mathrm{n}-1)}{2.4.6...2n} x^{n-1}, x > 0$
- (b) Test the convergence of the series $\sum_{n=0}^{\infty} ne^{-n^2}$

- 3(a) Test the convergence of the series $x \frac{x^2}{2} + \frac{x^3}{3} \frac{x^4}{4}$... if x < 1
- (b) Test the convergence of the series $\sum_{n=1}^{\infty} (-1)^{n+1} (\sqrt{n+1} \sqrt{n})$
- 4(a) Determine the convergence of an alternating series $\sum_{n=1}^{\infty} \frac{\cos n\pi}{n^2 + 1}$ for absolute and conditional convergence.
- (b) Examine the series $1 \frac{x^2}{2^2} + \frac{x^4}{2^2 4^2} \frac{x^6}{2^2 4^2 6^2} + \dots$ for absolute convergence