B.Sc. I   Code - B-126   Algebra & Trigonometry

Sequence & Infinite Series

Q.1. Show that the sequence $\langle 1/n \rangle$ has the limit 0.

Q.2. Show that the sequence $\langle s_n \rangle$ defined by
$s_n = \{\sqrt{(n+1)} - \sqrt{n}\}\ \forall n \in N$ is convergent

Q.3 Define divergent sequence with example.

Q.4 Give an example of a sequence with is bounded but not convergent.

Q.5 Give the statement of Sandwich theorem for sequences.

Q.6. Define Cauchy sequences. Is Cauchy sequence bounded.

Q.7 Show that the sequence $\langle s_n \rangle$ defined by

$s_1 = \sqrt{2},\ s_{n+1} = \sqrt{2s_n}$ converges to 2.

Q.8 Prove that the sequence $\left\langle \frac{n^2+3n+5}{2n^2+5n+7} \right\rangle$ converges to $\frac{1}{2}$.

Q.9. Using definition of the limit of a sequence show that the sequence $\left\langle \frac{2n}{n+3} \right\rangle$ converges to 2.

Q.10 Define sub sequence of a sequence.

Q.11 Prove that the series $\sum \frac{1}{4^n}$ converges to $1/3$

Q.12 Give the statement of Comparison test for series of positive terms.

Q.13. Test for convergen the series

$$\frac{1}{\log 2} + \frac{1}{\log 3} + \cdots + \frac{1}{\log 4} + \cdots$$

Q.14 Test the convergence of the series whose nth term is given by $u_n = \sqrt{(n^4+1)} - \sqrt{(n^4-1)}$

Q.15. Give the statement of Raabe's test

Q.16 Give the statement of Cauchy - maclaurin's Integral test and hence find the convergent of the series. (i) $\sum \frac{1}{n^2+1}$   (ii) $\sum \frac{1}{n(n+1)}$

Q.17 Define Alternating series and Also give the statement of Leibnitz's test.

Q.18 Define Absolute Convergence, semi convergent.

Q.19. Show that the series

$\sum (-1)^n \frac{1}{n^2}$ is Absolutely convergent

Q.20 Test the convergence of the series

(i) $\sum_{n=1}^{\infty} \frac{1}{n^3}\left(\frac{n+2}{n+3}\right)^n$

(ii) $\frac{x^2}{2\sqrt{1}} + \frac{x^3}{3\sqrt{2}} + \frac{x^4}{4\sqrt{3}} + \cdots \quad x > 0$