Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (Computer Science) (2013 & Onwards) (Sem.–3)

SEQUENCE SERIES AND CALCULUS

Subject Code : BCS-302

M.Code : 71774

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt ANY FOUR questions.**

SECTION-A

1. Write briefly :

a) State Cauchy's Integral test.

b) Show that $\sum_{n=1}^{\infty} \frac{\sin nx}{n^2}$ is convergent series.

c) Define Alternating series with example.

d) State Bertrand's test.

e) Show that $\{1 + (-1)^n\}$ oscillates finitely.

f) Define Beta function with example.

g) Show that $\int_{-1}^{1} |x|\, dx = 1$

h) State second mean value theorem.

i) Test for convergence $\int_{0}^{1} \frac{\sin x}{x^{\frac{3}{2}}} dx$

j) State Cauchy test for convergence of improper integral.

SECTION-B

2. a) State and Prove Sandwich theorem.

   b) If $\lim a_n = a$ and $a_n \geq 0$, $\forall\ n$. Then $a \geq 0$.

3. a) Test for convergence of the series whose nth term is $\frac{n(n-1)....1}{n^n}$.

   b) State and Prove Logarithmic Test.

4. a) State and Prove Leibnitz's test.

   b) Prove that every absolutely convergent series is convergent.

5. State and Prove Darboux's theorem.

6. a) If a function f is monotonic on [a,b], then it is integrable on [a,b].

   b) Show that a bounded function f is integrable on [a, b], if the set of its points of discontinuity has only a finite number of limit points.

7. Show that $\int_0^{\frac{\pi}{2}} \log \sin x dx$ is convergent and hence evaluate it.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.