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

Total No. of Questions : 07

B.Sc. (Computer Science) (2013 & Onwards)   (Sem.–1)
CALCULUS
Subject Code : BCS-102
M.Code : 70879

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) What is Right hand limit & Left hand limit?

   b) State algebra of limits.

   c) Differentiate $\sqrt{cosh^2 x - 1}, (x \neq 0)$.

   d) Define uniform continuity.

   e) Define absolute values.

   f) State Leibnitz theorem.

   g) Test the curve $y = x^4$ for points of inflexion.

   h) Find asymptotes of the curve $r \log \theta = a$.

   i) State Maclaurin's theorem with various form of remainder.

   j) Find $\lim_{n \to \infty} \left(1 + \dfrac{1}{n}\right)^n$.

SECTION-B

2. State and prove theorem on uniqueness of a limit.

3. State and prove maximum and minimum values theorem.

4. State and prove intermediate value theorem.

5. a) Examine for convex upwards and point of inflexion of the curve $y = x^4 - 2x^3 + 1$.

   b) If $y = \sin^2 x \cos 4x$, find y_n.

6. a) Find all the asymptotes of the curve $x^4 - y^4 + xy = 0$.

   b) If $y = (\sin^{-1} x)^2$, then show that $(1 - x^2) y_2 - xy_1 = 2$. Hence or otherwise prove that $(1 - x)^2 y_{n+2} - (2n + 1) xy_{n+1} - n^2 y_n = 0$

7. Trace the curve $y = x / (x - 1)$.

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