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Roll No.	I No. of Pages : 02
Total No. of Questions : 07	
B.Sc. (Computer Science) (2013 & Onwards) CALCULUS	(Sem.–1)
Subject Code:BCS-102 Paper ID:[A2182]	
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 Intermediate Value Theorem.
 - (b) Write a short note on composite functions.
 - (c) Write asymptotes (if any) of the curve $r = a (1 \cos(\theta))$.
 - (d) Find the asymptotes parallel to y-axis of curve $x^3 2x^2y + xy^2 + x^2 xy + 2 = 0$.
 - (e) Find the n^{th} derivative of x^n w.r.t. x.
 - (f) Write a short note on asymptotes.
 - (g) Discuss the symmetry of the curve $r = a (\sec(\theta) + \cos(\theta))$.
 - (h) Differentiate cosh(x) w.r.t. x.
 - (i) Write a short note on greatest lower bound (g.l.b.) of sets of real numbers.
 - (j) Write a short note on limit of a function.



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SECTION-B

- 2. Prove that $\tan^{-1}(x) = x \frac{1}{3}x^3 + \frac{1}{5}x^5 \dots$, hence find the value of π .
- 3. Find the range of values of x for which the following curve is concave upwards or downwards: $y = (x^2 + 4x + 5) e^{-1}$, Find also the point(s) of inflexion.
- 4. Trace the curve $y^2(a+x) = x^2(3a-x)$.

5. Evaluate
$$\lim_{x \to 0} \left[\frac{a^x + b^x}{2} \right]^{\frac{1}{x}}$$
.

- 6. Discuss the continuity of f at x = 1, where f(x) = [1 x] + [x + 1].
- 7. Prove that if a function is uniformly continuous on an interval *I*, then it is continuous on *I*. By taking an example prove that converse need not to be true.

