**NEPAL COLLEGE OF INFORMATION TECHNOLOGY MODEL QUESTION**

| Level: Bachelor |  |  |
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| Programme: BE | | Full Marks: 100 |
| Course: Calculus I | | Time : 3hrs. |

| *Candidates are required to give their answers in their own words as far as practicable.* |
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| *The figures in the margin indicate full marks.* |
| ***Attempt all the questions.*** |

|  | 1a. A function is defined as follows    Is  continuous at x = 2? Does  exist at this point?  b. If y = (sin-1 x)2, prove that (1 – x2) y2 – xy1 – 2 = 0 and hence show that (1 – x2) yn+2 – (2n +1) xyn+1 – n2 yn = 0 . 5   1. State Lagranges mean value and give its geometrical meaning. Using it, show that, if f (x) > 0 in [a, b] function f(x) is increasing in [a, b]. | | 5  5 |
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|  | 1. a. Evaluate   b. Find the asymptotes for the curve x2(x-y)2-a2(x2+y2)=0 5  **c.** Define radius of curvature of the curve. Find radius of curvature of the curve at a point where it meets the line y=x.  OR  Trace the curve y2(2a-x)=x3 5 | | 5 |
| 3 | Integrate for the following      b). Obtain the reduction formula for  and hence evaluate : .  c). Show that . | | 3×5 |
| 4 | 1. Solve 2. Solve:  5 | | 5 |
|  | 1. Solve y" +9y = sec3x by Wronskian method 5 2. a) Solve the following initial value problem.   y" + y' – 2y = 0, y(0) = 4, y' (0) = 1. 5 | |  |
| 6 | 1. Write down the criteria for a function ƒ(x, y) of two variables x & y to have maximum or minimum values at a point. Find the minimum value of such that. 2. State and prove Eulers theorem for homogeneous function of two variables in x and y of degree n. If u = log | | 7  8 |
| 7 | Solve the following:   1. Find domain and range of the function y = . 2. Evaluate . 3. Find the arc length of the curve, . 4. Evaluate | 5×2.5=10 | |