Pokhara University

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| Level: Bachelor | Semester – Fall | Year : 2012 |
| Programme: BE | | Full Marks: 100 |
| Course: Engineering Mathematics I | | Pass Marks: 45 |
| Time : 3hrs. |

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

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|  | 1. State and prove the Cauchy’s Mean Value theorem. Does the theorem applicable to the functions f(x) = x and g(x) = x2 – 2x in the interval [0, 2]? Why? 2. State Leibnitz's theorem for successive derivative of product of two functions y = u.v If show that    **OR**  Show that the function *f* defined as follows is continuous at x = 1 and x = 2.  f(x) =  Also show that *f* is derivable at x = 2 but not at x = 1. | 7  8  8 |
|  | 1. Evaluate 2. The strength of a beam varies jointly as it’s breadth and square of the depth. Find the dimension of the strongest beam that can be cut from a circular wooden log of radius a.   **OR**  Find the asymptotes of the curve y3+x2y+2xy2-y+1=0. | 7  8  8 |
|  | Integrate any THREE of the following: | 15 |
|  | 1. Find the area included between the curve x2 = 4y and the line x = 4y – 2. 2. Find the reduction formula for and then evaluate   **OR**  Approximate the integral with n = 4, using Trapezoidal and Simpson’s rule. | 7  8  8 |
|  | 1. Define vector triple product. If **a** = **i** – 2 **j** – 3 **k**, **b** = 2**i** + **j** – **k** & **c** = **i** + 3**j** – 2**k** find (**a** × **b**) × **c**. Also verify that **a × (b × c) = (a . c)b – (a . b) c.** 2. Find a set of reciprocal vector of | 7  8 |
|  | 1. Define eccentricity of a conic section, and derive the equation of a hyperbola in its standard form. 2. Find the condition for the line to be tangent to the ellipse . | 8  7 |
|  | Attempt all the questions:   1. Evaluate 2. Find the radius of curvature of curve at (0, 0). 3. Integrate 4. Find the center, vertices and foci of the ellipse 5. Evaluate | 2  2  2  2  2 |