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**Jaypee Institute of Information Technology University, Sector 128 – Noida**
**Test -1(B. tech. first year)**

**COURSE NAME: MATHEMATICS 1** | **MAX. TIME: 1 HR.**
**COURSE CODE: 07B11MA101** | **MAX. MARKS: 20**

**Note: Attempt all questions.**

**Q1. Check whether the limit of the function f(x,y) near point (0,0) exists?**

$$f(x,y) = \tan^{-1}\left(\frac{|x|+|y|}{x^2+y^2}\right)$$

**If yes then find the value, otherwise justify.** [4]

**Q2. Obtain the second order Taylor series approximation to the function**

$$f(x,y) = x^2 - xy + \frac{y^2}{2} + 3$$

**about the point (3,2). Calculate the value of the function at (3.01, 2.01) using the series and then compare the value by direct substitution in the function f(x,y). [4]**

**Q3: Find the absolute maxima or minima of the function**

$$f(x,y) = x^2 - xy + y^2 + 1$$

**on a closed region in the first quadrant bounded by the lines x=0, y=4 & y=x. [4]**

**Q4. Sketch the region of the integration for the integral**

$$\int_0^2 \int_{x^2}^{2x} (4x+2)\, dy\, dx$$

**and calculate the integral using change of order of integration.** [4]

**Q5. Find the area of the region cut from the first quadrant by the Cardioid**

$$r = 1 + \sin\theta$$

[4]


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