COURSE CODE: 10B11MA212   MAX. MARKS: 15
COURSE NAME: Basic Mathematics II
COURSE CREDITS: 04   MAX. TIME: 1 hour

Note: All questions are compulsory. Marks are indicated in square bracket against each question. Use of any type of calculator is not allowed.

Q1. Check the convergence or divergence of the series $\sum_{n=0}^{\infty} \frac{2n^3+5}{4n^5+1}$ [3]

Q2. If $\sin u = \frac{x^2 y^2}{x+y}$, Show that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 3 \tan u$ using Euler's theorem.   [3]

Q3. If $u = x^2 \tan^{-1} \frac{y}{x} - y^2 \tan^{-1} \frac{x}{y}$, show that $\frac{\partial^2 u}{\partial x \partial y} = \frac{x^2 - y^2}{x^2 + y^2}$ [3]

Q4. Expand $f(x, y) = x^4 y + x^3 y^2 + x^2 y^3 + 7y$ in powers of $(x - 1)$ *and* $(y + 2)$ using

Taylor series.   [3]

Q5. Find a unit vector normal to the surface $xy^3 z^2 = 4$ at the point $(-1, -1, 2)$ [3]