Course Code: 1MSCM2
Course: Real Analysis-I
Credit: 4
Last Submission Date: April 30 (for January Session)
October 31, (for July session)

Max. Marks:-70
Min. Marks:-25

Note:-attempt all questions.

Que.1 Show that sequence $\{\frac{2n+3}{3n-2}\}$ is convergent.

Que.2 Prove that $\lim_{n\to\infty}\{\frac{x^n}{n}\}$ =0 if $|x| < 1$

Que.3 Test the convergence of the series

$$x + \frac{2^2x^2}{2!} + \frac{3^3x^3}{3!} + \text{-------}$$

Que.4 Test the convergence or divergence of the series

$$1^p + (\frac{1}{2})^p + (\frac{1.3}{2.4})^p + (\frac{1.3.5}{2.4.6})^p + \text{-------}$$

Que.5 Suppose $g(x) = \sum_{n=0} c_n x^n$ be a power series which converges for $|x| < 1$, If

$\sum_{n=0} c_n$ converges then $\lim_{x\to 1} g(x) = \sum_{n=0} c_n$

Que.6 If $\sum u_n$ is convergent then $\lim\limits_{n\to 0} u_n = 0$

Que.7 State and prove Bolzano – weierstrass theorem.
Que.8 State & prove Baire category theorem for R.
Que.9 State & prove Cauchy' mean value theorem.

Que.10 If $f(x,y) = \begin{cases} \frac{xy}{x^2+y^2}, & for\ (x,y) \neq (0,0) \\ 0, & for\ (x,y) = (0,0) \end{cases}$

Find $f_x(0,0)$ and $f_y(0,0)$