M-203, FIRST MIDTERM EXAMINATION
(Semester-II, 1438-1439)
Department of Mathematics, College of Science
KING SAUD UNIVERSITY

Time: 90 Min.

Max Marks-25

Q.1 Test the convergence or divergence of the sequence

$$\left\{\frac{7^{-n}}{\csc n}\right\}$$

[4]

and if it is converges, find its limit. [5]

Q.2 Find the sum of the series

$$\sum_{n=1}^{\infty}\left[\left(\frac{e}{\pi}\right)^{n}+\frac{2}{(n+1)(n+3)}\right].$$

Q.3 Determine whether the following series

$$\sum_{n=2}^{\infty}\frac{(-1)^n}{\ln n}$$

is conditionally convergent, absolutely convergent or divergent. [5]

Q.4 Find the interval of convergence for the power series [5]

$$\sum_{n=2}^{\infty}\frac{(-1)^n}{(2n+1)}x^{2n+1}.$$

Q.5 Find the Maclaurin series of the function $f(x)=\cos 2x$ and use first three nonzero terms to approximate the value of the following integral to four decimal places [6]

$$\int_{0}^{0.1}\sin^2 x dx.$$