RAMSADAY COLLEGE

Department of Mathematics.

Semester-VI MTMG-DSE-B.

Tutorial Examination-2022, F.M-15 (3×5)

Attempt all questions

Q) 1) Show that the sequence of functions $\{f_n(x)\}$ where $f_n(x) = \frac{nx}{n+x}$ converges uniformly on $[0, a]$, $a>0$.

Q) 2) Find the radius of convergence of the power series

$$\frac{1}{2}x + \frac{1\cdot 3}{2\cdot 5}x^2 + \frac{1\cdot 3\cdot 5}{2\cdot 5\cdot 8}x^3 + \frac{1\cdot 3\cdot 5\cdot 7}{2\cdot 5\cdot 8\cdot 11}x^4 + \cdots\cdots$$

Q) 3) Find the Fourier series of the function $f(x) = |x|$ in $-1 \le x \le 1$. Hence show that $1 + \frac{1}{3^2} + \frac{1}{5^2} + \cdots = \frac{\pi^2}{8}$

Q) 4) Show that $L(\sin at + t\cos at) = \frac{(a+1)p^2 + (a-1)a^2}{(p^2+a^2)^2}$

Q) 5) Solve the initial value problem using Laplace transform:

$(D^2 + 3D + 2)y = 0$, given that $y(0) = A$, $y'(0) = B$ and $D \equiv \frac{d}{dt}$

Submit Answer Script through the email

"mathsdept22rsc@gmail.com"