JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-I Semester (BT/BI)

COURSE CODE (CREDITS): 24B11MA212   MAX. MARKS: 25

COURSE NAME: MATHEMATICS FOR LIFE SCIENCES-II

COURSE INSTRUCTORS: MDS   MAX. TIME: 1 Hour 30 Min

Note: (a) *All questions are compulsory.*
         (b) *The candidate is allowed to make Suitable numeric assumptions wherever required*
             for solving problems

Q.No	Question	CO	Marks
Q1	(a) Examine the convergence of the following series $$\frac{\sqrt{1}}{5\cdot 7}+\frac{\sqrt{3}}{7\cdot 9}+\frac{\sqrt{5}}{9\cdot 11}+\cdots$$ (b) Test the following series for convergence, and conditionally convergence / absolute convergence $$\sum_{n=1}^{\infty}\frac{(-1)^{n+1}}{3n^2+n+5}$$	CO-1	2+3
Q2	(a) Show that the limit $$\lim_{(x,y)\to(0,0)}\frac{x^3y}{x^6+y^2}$$ does not exist. (b) If $u=\log\left(\frac{x^2+y^2}{x+y}\right)$, then find the value of $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=?$	CO-2	3+3
Q3	(a) Show that $\frac{\partial^2 f}{\partial x\partial y}=\frac{\partial^2 f}{\partial y\partial x}$, for all $(x,y)\neq(0,0)$, when $f(x,y)=\log(x^2+y^2)$. (b) Expand $f(x,y)=e^{xy}$, in powers of $(x-1)$ and $(y-1)$, using Taylor's series.	CO-2	3+3
Q5	Find all the local extreme values of the function $$f(x,y)=x^2+xy+y^2+3x-3y+4.$$	CO-2	3
Q6	(a) Solve the following differential equation $$\frac{dy}{dx}+3x^2 y=6x^2.$$ (b) Find the general solution of the following differential equation $$(D^2+5D+6)y=0.$$	CO-3	2.5+2.5