

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech. I Semester (CSE/IT/ECE/CE)

COURSE CODE (CREDITS): 18B11MA211

MAX. MARKS: 15

COURSE NAME: ENGINEERING MATHEMATICS II

COURSE INSTRUCTOR: RKB*

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is not allowed

Q.No	Question	CO	Marks
Q1	The evolution of the error function $y(x)$ near a critical point is modeled by the differential equation $(1 - x^2) \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 4y = 0$ where x represents the learning rate parameter. Find the solution as a power series about $x = 0$.	CO-1	4
Q2	Discuss the convergence of $\frac{x}{1 \cdot 2} + \frac{x^2}{3 \cdot 4} + \frac{x^3}{5 \cdot 6} + \frac{x^4}{7 \cdot 8} + \dots$	CO-2	2
Q3	In a distributed computing system, the processing load $y(x)$ on a server varies with time x . Due to proportional scaling of resource allocation and adaptive feedback, the load dynamics is modeled by the differential equation $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + 5y = 0$. Solve the equation to obtain the general expression for the solution.	CO-1	3
Q4	Discuss the convergence of the following series $\sum (\sqrt{n^2 + 1} - n).$	CO-2	3
Q5	Solve the differential equation using the method of variation of parameters. $y'' + 4y = \tan 2x$.	CO-1	3