

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T-1, EXAMINATION- 2023

B. Tech. II Semester (BI/BT)

COURSE CODE (CREDITS): 18B11MA212 (04)

MAX. MARKS: 15

COURSE NAME: BASIC MATHEMATICS-II

COURSE INSTRUCTORS: MDS

MAX. TIME: 1:00 Hrs.

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Quest.(1) Examine the sequence $\langle S_n \rangle_{n \in \mathbb{N}}$, where

$$S_n = \frac{n+3}{(n+2)(n+3)}$$

for boundedness, monotonicity and convergence.

[3] [CO-1]

Quest (2) Write down the n^{th} term of the infinite series

[3] [CO-1]

$$\frac{1 \cdot 2}{3^2 \cdot 4^2} + \frac{3 \cdot 4}{5^2 \cdot 6^2} + \frac{5 \cdot 6}{7^2 \cdot 8^2} + \dots$$

and also investigate the convergence.

Quest (3) Test the convergence of the following series

[3] [CO-1]

$$\sum_{n=1}^{\infty} \frac{n^3 - 5}{n^3 + 5} x^n$$

Quest (4) Examine the following infinite series

[3] [CO-1]

$$\sum_{n=1}^{\infty} (-1)^{n+1} \left(\frac{(4n-3)}{(2n-1)n^2} \right)$$

for the absolute convergence and conditionally convergent.

Quest (5) Show that

[3] [CO-2]

$$f(x, y) = \begin{cases} \frac{3x^2y}{x^3 + y^3}, & \text{when } (x, y) \neq (0, 0) \\ 0 & \text{when } (x, y) = (0, 0) \end{cases}$$

is continuous at every point except the origin (0,0).