JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION-2022

Ph.D.-I Semester (PMS)

COURSE CODE (CREDITS): 22P1WPH132 (3)

COURSE NAME: Computational Methods

COURSE INSTRUCTORS: Santu Baidya

MAX. MARKS: 25

MAX. TIME: 1 Hour 30 Min

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

Q1. Write down the central difference interpolation (Stirling's) formula and explain when the formula can be used. For the following data points find the approximate values of $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x=1.6 and x=2.2.

[8]

x	y
1.0	2.7183
1.2	3.3201
1.4	4.0552
1.6	4.9530
1.8	6.0496
2.0	7.3891
2.2	9.0250

Q2. For an unevenly spaced set of data {x,y} write an interpolation formula that can be used to find any x value within the range of x given in the set. Explain each term.

[5]

Q3. Find the Lagrange interpolating polynomial of degree 2 approximating the function y = ln(x) defined by the following table of values. Determine the value of ln(2.7)

[8]

x	2.0	2.5	3.0
ln x	0.69315	0.91629	1.09861

Q4. Define absolute error and relative error in computing any function with an example.

[4]