**CENTURION UNIVERSITY OF TECHNOLOGY & MANAGEMENT, PARALAKHEMUNDI, ODISHA**

***Subject Name: - Complex Analysis & Numerical Methods, Subject Code:-CUTM1003***

**Odd *Semester (BTECH)-2023-24***

***ASSIGNMENT-III***

***Short Questions.***

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1. Find
2. Prove that
4. Evaluate , where *E* is defined by 
5. Evaluate
6. Evaluate
7. Find
8. Evaluate, taking h=1
9. Show that
10. Prove that
11. Evaluate, taking h=1.
12. Given the following table of values:

|  |  |  |
| --- | --- | --- |
| x | 0.5 | 0.7 |
| f(x) | -0.693 | -0.357 |

Estimate the value of f (0.6) using Lagrange’s Interpolation

1. Given the table of values:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | 150 | 152 | 154 | 156 |
| f(x) = | 12.247 | 12.329 | 12.41 | 12.49 |

Find the value of  using Lagrange’s interpolation formula.

1. Express as a sum of partial fractions, using Lagrange’s interpolation formula.
2. Using Newton’s Forward formula ,find the value of f(1.6) from the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | 1 | 1.4 | 1.8 | 2.2 |
| f(x) | 3.49 | 4.82 | 5.96 | 6.5 |

***Long Questions.***

1. Compute the missing values in the following table :

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 45 | 50 | 55 | 60 | 65 |
| y | 3 | - - - | 2 | - - - | -2.4 |

1. Using Newton’s Interpolation formula compute from the following table.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x | 40 | 50 | 60 | 70 | 80 | 90 |
| f(x) | 184 | 204 | 226 | 250 | 276 | 304 |

1. Form the table of backward differences of the function
2. Certain corresponding values of are given below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | 300 | 304 | 305 | 307 |
| f(x) = | 2.4771 | 2.4829 | 2.4843 | 2.4871 |

Find by Newton’s Divided Difference Interpolation Formula

1. Evaluate by Trapezoidal Rule taking h = 0.25.
2. Integrate using Trapezoidal rule (take n=4)
3. Find the value of π by integrating:

, using Simpson’s 1/3rd rule (take n=4).

1. Use Simpson’s 1/3rd rule to find the value of, dividing the range into 4 equal parts.

1. Solve the IVP, using the Runge- Kutta Method, y (0) = 0, h = 0.2,



1. Using fourth-order Runge –Kutta method, find the solution of

with initial condition with h=0.2, 0 x 0.4.