REV-01
BCA/60/70

2023/12

SET A

BACHELOR OF COMPUTER APPLICATION
THIRD SEMESTER
COMPUTER ORIENTED NUMERICAL METHODS
BCA-304

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 1hr. 30 mins. **Full Marks: 35**

Objective

Time: 15 mins. **Marks: 10**

Choose the correct answer from the following: *1X10=10*

1. $1 + \Delta =$
   a. e
   b. E^{-1}
   c. E
   d. None of these

2. $1 - \nabla =$
   a. e
   b. E^{-1}
   c. E
   d. None of these

3. $\Delta\nabla =$
   a. $\frac{\Delta}{\nabla} - \frac{\nabla}{\Delta}$
   b. $\frac{\Delta}{\nabla} + \frac{\nabla}{\Delta}$
   c. $\frac{\Delta}{\nabla} \times \frac{\nabla}{\Delta}$
   d. None of these

4. $\Delta =$
   a. $E\nabla$
   b. ∇E
   c. Both of a and b
   d. None of these

5. f(x) is a polynomial of degree n then
   a. $\Delta^n f(x) = 0$
   b. $\Delta^n f(x) =$ polynomial of degree n-1
   c. $\Delta^n f(x) = polynomial$
   d. $\Delta^n f(x) = constant$

6. $E^{-2} f(x + h) =$
   a. $f(x + h)$
   b. $f(x - 2h)$
   c. $f(x + 2h)$
   d. $f(x - h)$

7. If the data is equally spaced and interpolation is near the beginning of the data then_____ interpolation formula is used
   a. Newton Backward difference
   b. Lagrange's interpolation
   c. Newton divided differences
   d. Newton's forward difference

8. If the data is equally spaced and interpolation is near the end of the data then_____ interpolation formula is used
   a. Newton Backward difference
   b. Newton divided differences

c. Newton divided differences

d. Newton's forward difference

9. If the data is unequally spaced and interpolation is near the end of the data then _____ interpolation formula is used

a. Newton divided differences

b. Newton divided differences

c. Both a and b

d. None of these

10. $\nabla f(x) =$ _____

a. $f(x + h) - f(x)$

b. $f(x) - f(x - h)$

c. $f(x - h) - f(x)$

d. $f(x) - f(x + h$

(Descriptive)

Time : 1 hr. 15 mins. **Marks : 25**

[Answer question no.1 & any two (2) from the rest]

1. Prove that $\Delta\nabla = (E^{\frac{1}{2}} - E^{\frac{-1}{2}})^2 = \Delta - \nabla$ 5

2. a. Evaluate $\Delta tan^{-1}x$ [assuming h=1] 5+5=10

   b. Write down the Newton Gregory forward and Newton Gregory backward formula.

3. a. If $f(x) = \frac{5x+12}{x^2+5x+6}$, find $\Delta f(x)$, taking interval of difference as unity. 5+5=10

   b. Find the third divided difference of $f(x) = 1$ x with the arguments 1, 3, 4, 7 3

4. Prove that $e^x = \left(\frac{\Delta^2}{E}\right) e^x . \frac{Ee^x}{\Delta^2 e^x}$ 10

5. Using Lagrange's interpolation formula, Prove that 10

$$y_0 = \frac{1}{2}(y_1 + y_{-1}) - \frac{1}{8}[\frac{1}{2}(y_3 - y_1) - \frac{1}{2}(y_{-1} - y_{-3})]$$