SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : Mathematics-III **Course & Branch**: B.Tech – ALL

Year & Sem: **Regulation:** R15

UNIT –I

1. Using Newton's Forward Interpolation Formulae , find the polynomial $y = tanx$ satisfying the following data, Hence evaluate $tan(0.12)$ and $tan(0.28)$

X	0.10	0.15	0.20	0.25	0.30
Y	0.1003	0.1511	0.2027	0.2533	0.3093

[10M]

2.Use Bessels formula to compute $f(1.95)$ from the following data

X	1.7	1.8	1.9	2.0	2.1	2.2	2.3
Y	2.979	3.144	3.283	3.391	3.463	3.997	4.491

[10M]

3.Using stirlings formula , compute $f(1.22)$ from the following data

X	1.0	1.1	1.2	1.3	1.4
Y	0.841	0.891	0.932	0.963	0.985

[10M]

4.Apply Newton's Forward Interpolation Formula to compute the value of $\sqrt{5.5}$ up to three decimal places. Given $\sqrt{5} = 2.236, \sqrt{6} = 2.449, \sqrt{7} = 2.646, \sqrt{8} = 2.828$ [5M]

5 a) Given $f(2) = 10$, $f(1) = 8$, $f(0) = 5$, $f(-1) = 10$ estimate $f(1/2)$ by using Gauss forward formula. [5M]

b) Evaluate $f(10)$ given $f(x) = 168,192,336$ at $x = 1,7,15$ respectively, use Lagrange interpolation. [5M]

6 a) Use Gauss Backward interpolation formula to find $f(32)$

given $f(25) = 0.2707$, $f(30) = 0.3027$ $f(35) = 0.3386$, $f(40) = 0.3794$ [5M]

b) Findthe unique polynomial $P(X)$ of degree 2 or less such that

$P(1) = 1$ $P(3) = 27$, $P4 = 64$ using Lagrange's interpolation formula. [5M]

7. a) Using lagrange's formula,calculate $f(3)$ from the following table.

X	0	1	2	4	5	6
$f(x)$	1	14	15	5	6	19

[5M]

b) Find $y(1.6)$ using Newton's forward difference formula from the table [5M]

X	1	1.4	1.8	2.2
Y	3.49	4.82	5.96	6.5

8 a) Using Lagrange's formula for interpolation find the value of $f(4)$

X	0	2	3	6
$f(x)$	-4	2	14	158

[5M]

b) Find $y(2.5)$ given that $y_{20} = 24$, $y_{24} = 32$, $y_{28} = 35$, $y_{32} = 40$ using Gauss forward interpolation formula. [5M]

9 a)Using Lagrange's formula express the function $\frac{x^2+6x-1}{(x^2-1)(x-4)(x-6)}$ [5M]

b) For $X - 0,1,2,4,5$; $f(X) - 1,14,15,5,6$ find $f(3)$ using forward difference table. [5M]

10 a) Write newton's forward interpolation formula. [2M]

b) Write newton's backward interpolation formula. [2M]

c) Write Lagrange's interpolation formula. [2M]

d) Write Stirllings formula. [2M]

e) Write Bessel's formula. [2M]

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QUESTION BANK (OBJECTIVE)

Subject with Code : Mathematics-III **Course & Branch**: B.Tech - ALL

Year & Sem: II-B.Tech & I-Sem **Regulation:** R15

UNIT – III

1. D is called [ ]
   A)Displacement operator B) Forward difference operator
   C) Backward difference operator D) Averaging operator

2. δ is called [ ]
   A)Displacement operator B) Forward difference operator
   C) Backward difference operator D) Averaging operator

3. Find y at x=0.8 to the following table [ ]

X	0	1	2
y	1	1.8	3.3

   A)Newton's forward formula B)Newton's backward formula
   C) Gauss formula D) Lagrange's formula

4. The following is used for unequal interval of x values [ ]
   A) Lagrange's formula B) Newton's forward formula
   C)Newton's backward formula D)Gauss forward formula

5. If x = 0,1,2,3 and y = 1,1.5,2.2,3.1 then $\Delta^2 f(3) =$
   A) 0.3 B)0.1 C)0.2 D)0.4

6. Gauss forward formula involves diffences below the central line and even differences on the line in Δ,then it is useful [ ]
   A) $0 < p < 1$ B)$-1 < p < 0$ C)$-\infty < p < 0$ D) $0 < p < \infty$

7. If the value to be determined is at the beginning of the difference table then we use [ ]
   A) Newton's forward formula B) Newton's backward formula
   C) Lagrange's formula D)Stirling's formula

8. If the value of be determined is at the end of table,then we use [ ]
   A) Newton's forward formula B) Newton's backward formula
   C) Lagrange's formula D)Stirling's formula

9) The relation between the operators E and D is --------- [ ]
   A) $E = e^{hD}$ B) $D = e^{hE}$ C) $E - D$ D) None

10) The $(n+1)^{th}$ order difference of the n^{th} degree polynomial is [ ]
   A)0 B)1 C)2 D)3

11) The relation between the operators and E is Δ is -------- [ ]
   A) $\Delta = E - 1$ B) $\Delta = E + 1$ C)) $\Delta = \frac{1}{E}$ D) None

12) μ is called -------- [ ]

A) Averaging operator B) Difference operator

C) Forward difference operator D) Backward difference operator

13) The relation between the operators and E is δ is -------- [ ]

A) $\delta = E^{\frac{1}{2}} + E^{\frac{-1}{2}}$ B) $\delta = E^{\frac{1}{2}} - E^{\frac{-1}{2}}$ C) $\delta = E^{2} - E^{-2}$ D) $\delta = E^{1} - E^{-1}$

14)Evaluate Δx is ---------- [ ]

A) h B)-h C)x+h D)None

15) If $x = 1,2,3,4$ and $f(x) = 1,4,27,64$ assume $x = 2.5$ then p = ------- [ ]

A) 1.5 B)1 C)0.25 D)2

16) If $x = 1.5$, $x_0 = 1$ and $h = 1$ then p =---------- [ ]

A)-0.5 B)0.5 C)0.4 D)1.5

17)If $x = 3.5, x_n = 4$ and $h = 2$ then p = ---------- [ ]

A)-0.25 B)0.25 C)0.025 D)-0.025

18)If h= $0.1, p = 1.5, x_0 = 0.1$ then x= ---------- [ ]

A)0.02 B)0.2 C)-0.25 D)0.25

19)By N.F.I.F. $\sqrt{5} = 2.236, \sqrt{6} = 2.449, \sqrt{7} = 2.646$ $then \sqrt{5.5} =$ [ ]

A)-2.345 B)2.0345 C)2.345 D)2.534

20)Find the unique polynomial $p(x)$ of degree 2 suchthat $p(0) = 0, p(1) = 1, p(2) = 4$ [ ]

A) $3x + 4x^2$ B) $4x + 3x^2$ C) $3x - 4x^2$ D)$-4x + 3x^2$

21)Find the missing term in the following data [ ]

X	0	1	2	3	4
y	1	3	9	-	81

A)29 B)13 C)31 D)30

22)From the following table find $\Delta y_{-2} =$ [ ]

X	0	5	10	15	20
y	7	11	14	18	24

A)-4 B)4 C)3 D)-3

23)The nth divided difference of a polynomial of degree 'n' is---------- [ ]

A)zero B)a constant C)a variable D)None

24)From the following table find $y(2) =$ [ ]

X	0	1	3
y	0	1.4	2.4

A) 2 B)-2 C)3 D)None

25) If h is the interval of differencing the $\Delta^2 x^3 =$ [ ]

A) $6h^2[x + h]$ B) $6h^2[x - h]$ C)$-6h^2[x + h]$ D)$-6h^2[x - h]$

26)Bessel's formula is most appropriate when p lies between ----------

A)-0.25 & 1.25 B) 0.25 & 0.75 C) 0.75 & 1 D)None

27)If h=1 then Δe^x ---------- [ ]

A) $e^x(e-1)$ B) $e^x(e+1)$ C) 0 D) $e^{2x}(e-1)$

28)The forward difference operator is ---------- [ ]

A) Δ B) ∇ C) μ D)None

29)The Backward difference operator is ---------- [ ]

A) Δ B) ∇ C) μ D)δ

30)Central difference operator is ---------- [ ]

A) Δ B) ∇ C) μ D)δ

31) $\Delta f(x) =$ ---------- [ ]

A) $f(x)-f(x+h)$ B)$-f(x)+f(x+h)$ C) $f(x+h)$ D) None

32) $\nabla f(x) =$---------- [ ]

A) $f(x)-f(x+h)$ B)$-f(x)+f(x+h)$ C) $f(x)-f(x-h)$ D) $f(x-h)$

33) $\Delta \equiv$ ---------- [ ]

A) $1-E$ B) $E-1$ C) $1-E^{-1}$ D) $1+E^{-1}$

34) $E \equiv$ ---------- [ ]

A) Δ B) $E-1$ C) $1+\Delta$ D) $1-\Delta$

35) $\Delta E =$---------- [ ]

A) Δ B) ∇ C) δ D)None

36) $\Delta \quad \nabla =$ ---------- [ ]

A) $\wedge$ B) ∇ C) δ^2 D) δ

37) $(1+\Delta)(1-\nabla) =$ ---------- --------- [ ]

A)0 B)1 C)2 D)-1

38) $\frac{\Delta^2}{E}(e^x) =$ ---------- --- [ ]

A) $e^x(e^h-1)^2$ B) $e^x(e^h-1)$ C) $e^{x-h}(e^h-1)^2$ D)None

39)Stirling's formula is best suitable for p lying between --- [ ]

A)) $\frac{1}{2}$& $-\frac{1}{2}$ B)-1 & 1 C)) $\frac{1}{4}$& $-\frac{1}{4}$ D) 0&1

40)From the following table if x = 0.05 then p = ------- [ ]

X	0	0.1	0.2	0.3	0.4
Y	1	1.2214	1.4918	1.8221	2.255

A)0 B)0.1 C)0.05 D)0.5

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