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

QUESTION BANK (DESCRIPTIVE)

Subject with Code : MATHEMATICS-III(15A54301) **Course & Branch**: B.Tech(ECE)

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

UNIT –I

1. a) Find the rank of the matrix $\begin{bmatrix} 3 & -1 & 2 \\ -6 & 2 & 4 \\ -3 & 1 & 2 \end{bmatrix}$ by using Echelon form. [5 M]

   b) Reduce the matrix $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 4 \\ 3 & 0 & 5 & 10 \end{bmatrix}$ into normal form. Find its rank. [5 M]

2. Find whether the following system of equations are consistent. If so solve them
   $x + 2y + 2z = 2;\ 3x - 2y - z = 5;\ 2x - 5y + 3z = -4;\ x + 4y + 6z = 0.$ [10 M]

3. Determine whether the following equations will have a non-trivial solutions, if so solve them $4x + 2y + z + 3w = 0;\ 6x + 3y + 4z + 7w = 0;\ 2x + y + w = 0.$ [10 M]

4. Discuss for what values of λ and μ, the simultaneous equations $x + y + z = 6$
   $x + 2y + 3z = 10;\ x + 2y + \lambda = \mu$ have $i)$ no solution $ii)$ a unique solution
   $iii)$ An infinite many solutions. [10 M]

5. Find the characteristic equation of the matrix $\begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence find the matrix represented by $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I.$ [10 M]

6. Verify Cayley Hamilton theorem for the matrix $\begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ find A^{-2} and A^4 using Cayley Hamilton theorem. [10 M]

7. Reduce the quadratic form to the sum of squares form by orthogonal reduction. Find index, Nature and Signature of the quadratic form $2x^2 + 2y^2 + 2z^2 - 2yz - 2zx - 2xy.$ [10 M]

8. Reduce the quadratic form $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ to the canonical form by Orthogonal reduction. Find index, nature and signature of the quadratic form. [10 M]

9. a) If $A = \begin{bmatrix} 3 & 7-4i & -2+5i \\ 7+4i & -2 & 3+i \\ -2-5i & 3+i & 4 \end{bmatrix}$ then prove A is Hermitian and iA is Skew-Hermitian.

   b) Prove that $\frac{1}{2}\begin{bmatrix} 1+i & -1+i \\ 1+i & 1-i \end{bmatrix}$ is unitary matrix. [5 M]

10. a) Define rank of a matrix. [2 M]

b) Test for the consistency of $x + y + z = 6; x - y + 2z = 5; 3x + y + z = -8$. [2 M]

c) Find the Eigen values of the matrix $\begin{bmatrix} 5 & -2 & 0 \\ -2 & 6 & 2 \\ 0 & 2 & 7 \end{bmatrix}$. [2 M]

d) Define Hermitian matrix and Skew- Hermitian matrix. [2 M]

e) State Cayley Hamilton Theorem. [2 M]

Prepared by: N.RAJAGOPAL REDDY

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

QUESTION BANK (OBJECTIVE)

Subject with Code : MATHEMATICS-III(15A54301) **Course & Branch**: B.Tech(ECE)

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

UNIT – I

1. If $A = \begin{bmatrix} a & c & b \\ b & a & c \\ c & b & a \end{bmatrix}$ is singular matrix then $a^3 + b^3 + c^3 =$ [ ]
   A) $3abc$ B) abc C) $(abc)^3$ D) 1
2. A square matrix A is symmetric if [ ]
   A) $A^T A = 0$ B) $A^T A = 1$ C) $A^T = -A$ D) $A^T = A$
3. A square matrix A is skew-symmetric if [ ]
   A) $A^T A = 0$ B) $A^T A = 1$ C) $A^T = -A$ D) $A^T = A$
4. The diagonal elements of a skew-symmetric matrix are all [ ]
   A) real B) imaginary C) zero D) one
5. A square matrix A is an orthogonal matrix if [ ]
   A) $A^{-1}A = I$ B) $A^T A = I$ C) $A^T = -A$ D) $A^T = A$
6. The rank of 3×3 non-singular matrix A is [ ]
   A) 2 B) 0 C) 1 D) 3
7. The rank of the singular matrix of order 3 is [ ]
   A) ≤ 3 B) ≤ 2 C) 1 D) 3
8. The system of equations are consistent, if [ ]
   A) $\rho(A) < \rho(AB)$ B) $\rho(A) \neq \rho(AB)$ C) $\rho(A) = \rho(AB)$ D) None
9. The system of linear equations has infinite many solution, if [ ]
   A) $r < n$ B) $r \neq n$ C) $r = n$ D) None

10. The system of linear equations has unique solution, if [ ]
A) $r < n$ B) $r \neq n$ C) $r = n$ D) None
11. The system of linear equations has $AX = 0$ is [ ]
A) Homogeneous B) non − homogeneous C) consistent D) None
12. The system of linear equations has trivial solution, if [ ]
A) $X < 0$ B) $X \neq n$ C) $X = n$ D) $X = 0$
13. The system of equations are inconsistent, if [ ]
A) $\rho(A) < \rho(AB)$ B) $\rho(A) \neq \rho(AB)$ C) $\rho(A) = \rho(AB)$ D) None
14. The rank of a unit matrix order 4 is [ ]
A) 2 B) 4 C) 1 D) 3
15. The rank of the singular matrix of order 3 is [ ]
A) ≤ 3 B) 2 C) 1 D) 3
16. The transpose of an orthogonal matrix is [ ]
A) symmetric B) unitary C) orthogonal D) Hermitian
17. The maximum value of the rank of a 4×5 matrix is [ ]
A) 2 B) 4 C) 5 D) 3
18. If A is a symmetric matrix then A^n (n is positive integer) is [ ]
A) symmetric B) unitary C) orthogonal D) Hermitian
19. The diagonal elements of a Skew-Hermitian matrix are all [ ]
A) real B) *purly* imaginary C) *zero* D) None
20. The diagonal elements of a Hermitian matrix are all [ ]
A) *purly* imaginary B) real C) *zero* D) None
21. A square matrix is said to be unitary if [ ]
A) $A^\theta A^T = A$ B) $A^\theta A = I$ C) $A^\theta A = 0$ D) None
22. Inverse f a unitary matrix is [ ]
A) Hermitian B) unitary C) orthogonal D) symmetric
23. The Eigen values of the unit matrix of order 3 is [ ]
A) 0,0,1 B) 1,1,0 C) 1,1,1 D) 1, −1,1
24. If one of the Eigen value is of a square matrix A, then the trace of A is [ ]
A) singular B) symmetric C) orthogonal D) non − singular
25. If $1, -1, 2$ be the Eigen value is of a square matrix A, then the trace of A is [ ]
A) -2 B) 0 C) 3 D) 2
26. The characteristic equation of the square matrix A is [ ]
A) $|A - \lambda I|$ B) $|A - \lambda I| \neq 0$ C) $|A - \lambda I| = 0$ D) $[A - \lambda I] = 0$
27. The latent root of $\begin{bmatrix} a & h & g \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$ are [ ]
A) $a, 0, c$ B) a, b, c C) a, h, c D) $0,0,0$
28. If $D = P^{-1}AP$ then $A^2 =$ [ ]
A) $P^{-1}A^2P$ B) $P^{-1}AP$ C) PDP^{-1} D) PD^2P^{-1}
29. The Eigen values of $\begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$ are [ ]
A) i, i B) $1, -1$ C) $i, -i$ D) $-1, -1$

30. If a square matrix A satisfies $A^T A = I$, then the matrix is [ ]

A) symmetric B) hermitian C)unitary D) orthogonal

31. The symmetric matrix associated with the quadratic form $x^2 + 3y^2 - 8xy$ [ ]

A)$\begin{bmatrix} 1 & -4 \\ -4 & 3 \end{bmatrix}$ B)$\begin{bmatrix} 1 & -4 \\ 4 & -3 \end{bmatrix}$ C)$\begin{bmatrix} 1 & 4 \\ 4 & -3 \end{bmatrix}$ D) $\begin{bmatrix} 1 & 4 \\ -4 & -3 \end{bmatrix}$

32. If A is Hermitian matrix then iA is [ ]

A) symmetric B)$skew -$ hermitian C)hermitian D) None

33. The symmetric matrix of the quadratic form $ax^2 + by^2 - 2hxy$ is [ ]

A)$\begin{bmatrix} a & -1 \\ -1 & b \end{bmatrix}$ B)$\begin{bmatrix} a & -h \\ -1 & b \end{bmatrix}$ C)$\begin{bmatrix} a & -h \\ -h & b \end{bmatrix}$ D) $\begin{bmatrix} a & -1 \\ -h & b \end{bmatrix}$

34. The Eigen values of A are $0,1,2$ then the nature of the quadratic form is [ ]

A) positive definite B) positive semi definite

C)negative definite D) indefinite

35. The Eigen values of A are -1,-4,-4 then the index of the quadratic form is [ ]

A) 1 B) 2 C)3 D) 0

36. The Eigen values of A are $0,0,6$ then the signature of the quadratic form is [ ]

A) 1 B) 2 C)3 D) 0

37. The index and signature of the quadratic form $x^2 + 3y^2 + 3z^2 - 2zy$ are [ ]

A) 2,3 B) 2,1 C) 3,3 D) 0,1

38. If the canonical form of a quadratic form is $y_1{}^2 + 2y_2{}^2 - 8y_3{}^2$ then index and Signature of the quadratic form is [ ]

A) 1,3 B) 2,1 C) 3,2 D) 0,1

39. The quadratic form corresponding to the symmetric matrix $\begin{bmatrix} 1 & 2 \\ 2 & -4 \end{bmatrix}$ is [ ]

A) $x^2 \quad 4y^2 + 4xy$ B) $x^2 \quad 4y^2 \quad 4xy$

C) $x^2 + 4y^2 + 4xy$ D) $x^2 + 4y^2 - 4xy$

40. The Eigen values of A are $0,1,0$ then the rank of the quadratic form is [ ]

A) 1 B) 2 C)3 D) 0

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

QUESTION BANK (DESCRIPTIVE)

Subject with Code : MATHEMATICS-III(15A54301) **Course & Branch**: B.Tech(ECE)

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

UNIT –II

1. Find a positive root of $x^3 - x - 1 = 0$ correct to two decimal places by bisection method. [10 M]

2. Find out the square root of 25 given $x_0 = 2.0$, $x_0 = 7.0$ using bisection method. [10 M]

3. Find out the root of the equation $x\log_{10}(x) = 1.2$ using false position method. [10 M]

4. Find the root of the equation $xe^x = 2$ using Regula-falsi method. [10 M]

5. Find a real root of the equation $xe^x - \cos x = 0$ using Newton- Raphson method. [10 M]

6. Using Newton-Raphson Method

 a) Find square root of 10. [5 M] b)Find cube root of 27. [5 M]

7. Apply Gauss-Seidel iteration method to solve the equations of $20x + y - 2z = 17$;

 $3x + 20y - z = -18$; $2x - 3y + 20z = 25$. [10 M]

8. Apply Crout's method to solve the equations: $3x + 2y + 7z = 4$; $2x + 3y + z = 5$;

 $3x + 4y + z = 7$. [10 M]

9. Find the root between 1 and 1.5 of the equation $\sin x = \frac{1}{x}$ (measured in radians).Carry out

 computation up to 7^{th} stage. [10 M]

10. a) Define transcendental Equation. [2 M]

 b) Using Newton –Raphson method find square root of a number. [2 M]

 c) Write the formula for Regula-Falsi method. [2 M]

 d) Write the first approximation of the equation $3x = \cos x + 1$ by bisection method. [2 M]

 e) Using Newton –Raphson method find reciprocal of a number. [2 M]

Prepared by: **R.LAKSHMI DEVI ,E.KARTHEEK**.

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

QUESTION BANK (OBJECTIVE)

Subject with Code : MATHEMATICS-III(15A54301) **Course & Branch**: B.Tech (ECE)

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

UNIT – II

1. Example of a transcendental equation [ ]

   A. $f(x)=c_1e^x+c_2e^{-x}=0$ B. $f(x)=x^2+x-7=0$ C. $f(x)=x^2+5x-7=0$ D. None

2. Example of a algebraic equation [ ]

   A. $f(x)=c_1e^x+c_2e^{-x}=0$ B. $f(x)=x^3-7=0$ C. $f(x)=c_1e^{2x}+c_2e^{-3x}=0$ D. None

3. The order of convergence in Newton-Raphson method is [ ]

   A. 1 B. 3 C. 0 D.2

4. The Newton-Raphson method fails when [ ]

   A. $f^1(x)$ is negative B. $f^1(x)$ is zero C. $f^1(x)$ is too large D. Never fails

5. In case of Bisection method, the convergence is [ ]

   A. linear B. 3 C. very slow D. quadratic

6. Under the conditions that f(a) and f(b) have opposite signs and a<b, the first approximation of one of the roots f(x)=0, by Regula-Falsi method is given by [ ]

   A. $x_1=\dfrac{af(a)-bf(b)}{f(a)-f(b)}$ B. $x_1=\dfrac{af(b)-bf(a)}{f(b)-f(a)}$

   C. $x_1=\dfrac{af(a)+bf(b)}{f(a)+f(b)}$ D. $x_1=\dfrac{af(b)-bf(a)}{f(b)+f(a)}$

7. Bisection method is used for [ ]

   A. Solution of algebraic or transcendental equation B. Integration of a function

   C. Differential of a function D. Solution of a function

8. For ------------ method of solution of equations of the form f(x) =0 approximation x_0 is to be very close to the root and $f(x_n)\neq 0$ [ ]

A. Bolzano B. Newton-Raphson C.Secent D. Chord

9. In the bisection method of solution of an equation of the form f(x) = 0 the convergence of the sequence $\langle x_n \rangle$ of midpoints to a root of f(x) = 0 in an interval (a,b) where f(a)f(b)<0 is [ ]

A. Assured and very fast B. Not assured but very fast

C. Assured but very slow D. Independent on the sequence of point

10. Newton-Raphson method is used for [ ]

A. Solution of algebraic or transcendental equation B. Integration of a function

C. Differential of a function D. Solution of a function

11. In the method of False position for solution of an equation of the form f(x) = 0 the convergence of the sequence $\langle x_n \rangle$ iterates to a root of f(x) = 0 is [ ]

A. Assured and very fast B. Not assured but very fast

C. Assured but slow D. Independent on the sequence of point

12. In Newton –Raphson method we approximate the graph of f by suitable [ ]

A. Chords B.Tangents C. Secants D. Parallel

13. Newton's iterative formula for finding a root of f(x) = 0 is [ ]

A. $x_{n+1} = x_n + \frac{f(x_n)}{f''(x_n)}$ B. $x_{n+1} = x_n - \frac{f(x_n)}{f''(x_n)}$

C. $x_{n+1} = x_n + \frac{f(x_n)}{f'(x_n)}$ D. $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

14. Newton-Raphson method is also called [ ]

A. Method of tangent B. Method of false position

C. Method of chord D. Method of secants

15. Among the method of solution of equation of the form f(x) = 0 the one which is used commonly for its simplicity and great speed is ---method [ ]

A. Secant B. Regula falsi C. Newton – Rasphson D. Bolzano

16. The Regula Falsi method is related to ________ at a point of the curve [ ]

A. Chord B. Ordinate C. Abscissa D. Tangent

17. The Newton – Raphson method is related to ________ at a point of the curve [ ]

A. Chord B. Ordinate C. Abscissa D. Tangent

18. Newton's iterative formula for finding the square root of a positive number N is [ ]

A. $x_{i+1}=\frac{1}{2}\left(x_i-\frac{N}{x_i}\right)$ B. $x_{i+1}=\frac{1}{2}\left(x_i+\frac{N}{x_i}\right)$

C. $x_{i+1}=\left(x_i-\frac{N}{x_i}\right)$ D. $x_{i+1}=2\left(x_i+\frac{N}{x_i}\right)$

19. Newton's iterative formula for finding the cube root of a number N is [ ]

A. $x_{n+1}=3\left(2x_n-\frac{N}{x_n^2}\right)$ B. $x_{n+1}=\frac{1}{3}\left(2x_n-\frac{N}{x_n^2}\right)$

C. $x_{n+1}=\left(2x_n-\frac{N}{x_n^2}\right)$ D. $x_{n+1}=\frac{1}{3}\left(2x_n+\frac{N}{x_n^2}\right)$

20. Newton's iterative formula for finding the reciprocal of a number N is [ ]

A. $x_{n+1}=\left(x_n-\frac{N}{x_n^2}\right)$ B. $x_{n+1}=x_n\left(2-\frac{N}{x_n}\right)$

C. $x_{n+1}=x_n\left(2-Nx_n\right)$ D. $x_{n+1}=x_n\left(2+Nx_n\right)$

21. Regula- falsi method is used for [ ]

A. Solution of algebraic or transcendental equation B. Integration of a function

C. Differential of a function D. Solution of a function

22. The cube root of 24 by Newton's formula taking $x_0=3$ is__________ [ ]

A.1.889 B.2.889 C.5.889 D.4.889

23. The square root of 35 by Newton's formula taking $x_0=6$ is__________ [ ]

A.7.916 B.5.916 C.6.916 D.4.916

24. Example of a transcendental equation [ ]

A. $f(x)=x\log x-1.2=0$ B. $f(x)=x^3-x-1=0$ C. $f(x)=x^2+x-7=0$ D. None

25. Example of a algebraic equation [ ]

A. $f(x) = x\log x - 1.2 = 0$ B. $f(x) = x^3 - x - 1 = 0$ C. $f(x) = x^2\tan x + 1 = 0$ D. None

26. If first two approximation x_0 and x_1 are roots of $x^3 - 9x + 1 = 0$ are 0 and 1 by bisecton method then x_2 is [ ]

A.1.5 B. 2.5 C. 0.5 D. 3.5

27. If first two approximation x_0 and x_1 are roots of $xe^x = 2$ are 0 and 1 by Regula-falsi method then x_2 is [ ]

A. 0.13575 B. 0.33575 C. 0.73575 D. 0.53575

28. If first two approximation x_0 and x_1 are roots of $x^3 - x - 4 = 0$ are 1 and 2 by bisecton method then x_2 is [ ]

A.1.5 B. 2.5 C. 0.5 D. 3.5

29. If first two approximation x_0 and x_1 are roots of $x^3 - x - 4 = 0$ are 1 and 2 by Regula-falsi method then x_2 is [ ]

A.4.666 B. 2.666 C. 3.666 D. 1.666

30. Newton's iterative formula for finding the pth root of a positive number N is [ ]

A. $x_{n+1} = \frac{1}{p}\left((p-1)x_n + \frac{N}{x_n^{p-1}}\right)$ B. $x_{n+1} = \frac{1}{p}\left((p-1)x_n - \frac{N}{x_n^{p-1}}\right)$

C. $x_{n+1} = p\left((p-1)x_n - \frac{N}{x_n^{p-1}}\right)$ D. $x_{n+1} = \left((p-1)x_n - \frac{N}{x_n^{p-1}}\right)$

31. The general iteration formula of the Regula Falsi method is [ ]

A. $x_{n+1} = x_n + \frac{x_n - x_{n-1}}{f(x_n) - f(x_{n-1})} f(x_n)$ B. $x_{n+1} = x_n + \frac{x_n + x_{n-1}}{f(x_n) - f(x_{n-1})} f(x_n)$

C. $x_{n+1} = x_n - \frac{x_n - x_{n-1}}{f(x_n) - f(x_{n-1})} f(x_n)$ D. $x_{n+1} = x_n - \frac{x_n - x_{n-1}}{f(x_n) + f(x_{n-1})} f(x_n)$

32. If first approximation root of $x^3 - 5x + 3 = 0$ is $x_0 = 0.64$ then x_1 by Newton-Raphson method is [ ]

A.4.6565 B. 2.6565 C. 3.6565 D. 0.6565

33. Newton's iterative formula to find the value of $\sqrt{N}$ is [ ]

A. $x_{n+1} = \frac{1}{2}\left(x_n + \frac{N}{x_n}\right)$ B. $x_{n+1} = \frac{1}{2}\left(x_n - \frac{N}{x_n}\right)$

C. $x_{n+1} = \left(x_n - \frac{N}{x_n}\right)$ D. $x_{n+1} = 2\left(x_n - \frac{N}{x_n}\right)$

34. If first approximation root of $x^2 - 10 = 0$ is $x_0 = 3.8$ then x_1 by Newton-Raphson method is [ ]

A.0.215 B. 1.215 C. 2.215 D. 3.215

35. Newton's iterative formula to find the value of $\sqrt[3]{N}$ is [ ]

A. $x_{n+1} = \frac{1}{3}\left(2x_n + \frac{N}{x_n^2}\right)$ B. $x_{n+1} = \frac{1}{3}\left(2x_n - \frac{N}{x_n^2}\right)$

C. $x_{n+1} = \left(2x_n - \frac{N}{x_n^2}\right)$ D. $x_{n+1} = 3\left(2x_n + \frac{N}{x_n^2}\right)$

36. If first two approximation x_0 and x_1 are roots of $2x - \log_{10}^{x} = 7$ are 3.5 and 4 by Regula-Falsi method then x_2 is [ ]

A. 1.7888 B. 2.7888 C. 3.7888 D. 4.7888

37. If first two approximation x_0 and x_1 are roots of $2x - \log_{10}^{x} = 7$ are 3.5 and 4 by Bisection method then x_2 is [ ]

A. 1.75 B. 2.75 C. 3.75 D. 4.75

38. Crout's triangularisation method is also called [ ]

A. Gauss elimination B. LU factorization C. Gauss jordan D. None of these

39. If first approximation root of $\cos x - x^2 - x = 0$ is $x_0 = 0.5$ then x_1 by Newton-Raphson method is [ ]

A.0.5514 B. 1.5514 C. 2.5514 D. 3.3314

40. If second approximation root of $x + \tan x + 1 = 0$ is $x_1 = 2.77558$ then x_2 by Newton-Raphson method is [ ]

A.1.798 B. 2.798 C. 2 D. 0.798

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

QUESTION BANK (DESCRIPTIVE)

Subject with Code : MATHEMATICS-III(15A54301) **Course & Branch**: B.Tech(ECE)

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

UNIT –IV

1. Derive normal equations to fit the straight line y = a+bx. [10 M]
2. Derive normal equations to fit the straight line y = a+bx+cx^2. [10 M]
3. a) Fit a straight line y=a+bx from the following data [5 M]

X	0	1	2	3	4
Y	1	1.8	3.3	4.5	6.3

b) Fit a straight line y=ax+b from the following data [5 M]

X	6	7	7	8	8	8	9	9	10
Y	5	5	4	5	4	3	4	3	3

4. Fit a second degree polynomial to the following data by the method of **least squares** [10 M]

X	0	1	2	3	4
Y	1	1.8	1.3	2.5	6.3

5. a) Fit the curve of the form $y = ae^{bx}$ [5 M]

X	77	100	185	239	285
Y	2.4	3.4	7.0	11.1	19.6

b) Fit the curve of the form $y = ab^x$ for [5 M]

X	2	3	4	5	6
Y	8.3	15.4	33.1	65.2	127.4

6. a) From the following table values of x and y, find $\frac{dy}{dx}, \frac{d^2y}{dx^2}$ for x =1.5 [5 M]

X	1.5	2.0	2.5	3.0	3.5	4.0
Y	3.375	7.0	13.625	24.0	38.875	59

b) From the following table values of x and y, find $\frac{dy}{dx}$, when x=3 and x=6 [5 M]

X	0	1	2	3	4	5	6
Y	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506	9.0309

7. Compute $f^1(4)$ from the following table [10 M]

X	1	2	4	8	10
Y	0	1	5	21	27

8. Evaluate $\int_0^1 \frac{1}{1+x}dx$ [10 M]

i) By trapezoidal rule and Simpson's $\frac{1}{3}$ rule.

ii) Using Simpson's $\frac{3}{8}$ rule and compare the result with actual value.

9. a) Compute $\int_0^4 e^x dx$ by Simpson's $\frac{1}{3}$ rule with 10 subdivisions. [5 M]

b) .Find $\int_3^7 x^2 \log x dx$, using trapezoidal rule and Simpson's rule by 10 sub divisions. [5 M]

10. a) Define error for least Square. b) What is Curve –fitting ? [5x2=10 M]

c) Write the trapezoidal rule formula. d) Write the normal equations for the straight line

$y = a+bx+cx^2$. e) Write the Simpson's $\frac{1}{3}$ rule formula.

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

QUESTION BANK (OBJECTIVE)

Subject with Code : MATHEMATICS-III(15A54301) **Course & Branch**: B.Tech (ECE)

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

UNIT – II

1.The princilple of least squares states that [ ]

a)sum of residuals is minimum b)sum of residuals is maximum

c)sum of squares of the residuals is minimum d)none

2. The process of calculating derivatives of a function near the beginning Of the table makes use of [ ]

a)Newton's forward interpolation formula b)Newton's backward formula

c)gauuss's formula d)lagrange's interpolation formula

3. In the general quadrature formula n=2 gives [ ]

a)Trapezoidal rule b)simpson's $\frac{1}{3}$ rule

c)simpson's $\frac{3}{8}$ rule d)weddle's rule

4. In the general quadrature formula n=3 gives [ ]

a)Trapezoidal rule b)simpson's $\frac{1}{3}$ rule

c)simpson's $\frac{3}{8}$ rule d)weddle's rule

5.In application of simpson's $\frac{1}{3}$ rule, the interval h for closer app should be [ ]

a)even and small b)odd and small

c)equal to zero d)none

6.By trapezoidal rule, $\int_a^b f(x)dx =$ [ ]

a) $\frac{h}{2}[(y_0+y_n)+2(y_1+y_2+.........+y_{n-1})]$

b) $\frac{h}{3}[(y_0+y_n)+2(y_1+y_2+.........+y_{n-1})]$

c) $\frac{h}{3}[(y_0+y_n)+2(y_2+y_4+.......)+3(y_1+y_3+....)]$ d)none

7.In simpson's $\frac{1}{3}$ rule the number of sub intervals should be [ ]

a)even b)odd c)multiple of 3 d)none

8. In simpson's $\frac{1}{3}$ rule the number of ordinates should be ` [ ]

a)even b)odd c)multiple of 3 d)none

9. In simpson's $\frac{3}{8}$ rule the number of sub intervals should be [ ]

a)even b)odd c)multiple of 3 d)none

10.Among Regula-falsi method and Newton-raphson method, the [ ]

Rate of convergence is faster for

a) Newton-raphson method b) Regula-falsi method c)cant say d)none

11.Normal equations of the straight line $y=a_0+a_1x$ are [ ]

a) $\sum y = ma_0 + a_1\sum x$ b) $\sum xy = a_0\sum x + a_1\sum x^2$

c)a&b d)none

12.If $y=a+bx+cx^2$ then the first normal equation by least square [ ]

Method is $\sum y_i =$

a) $ma_0 + a_1\sum x_i + a_2\sum x_i^2$ b) $a_0\sum x_i + a_1\sum x_i^2 + a_2\sum x_i^3$

c) $a_0\sum x_i^2 + a_1\sum x_i^3 + a_2\sum x_i^4$ d)none

13. If $y=a+bx+cx^2$ then the second normal equation by least square [ ]

Method is $\sum x_i y_i =$

a) $ma_0 + a_1\sum x_i + a_2\sum x_i^2$ b) $a_0\sum x_i + a_1\sum x_i^2 + a_2\sum x_i^3$

c) $a_0\sum x_i^2 + a_1\sum x_i^3 + a_2\sum x_i^4$ d)none

14. If $y = a + bx + cx^2$ then the third normal equation by least square [ ]

Method is $\sum x_i^2 y_i =$

a) $ma_0 + a_1\sum x_i + a_2\sum x_i^2$ b) $a_0\sum x_i + a_1\sum x_i^2 + a_2\sum x_i^3$

c) $a_0\sum x_i^2 + a_1\sum x_i^3 + a_2\sum x_i^4$ d)none

15. If $\sum x_i = 15, \sum y_i = 30, \sum x_i y_i = 110, \sum x_i^2 = 55$ and $y = a_0 + a_1 x$ [ ]

Then $a_0 =$

a)2.2 b)1.52 c)1.2 d)0

16. The n^{th} order difference of polynomial of n^{th} degree is [ ]

a) costant b)zero c) polynomial d) Symmetric

17. The normal equation of straight line is εy = [ ]

a) na+bεx b) na+εy c) na-bεy d) a+εy

18. The normal equation of parabola line is εy = [ ]

a) na+bεy+c b) na+bεx+cεx^2 c) na-bεx+εx^2 d) a+εx+εx^3

19. In exponential curve y=ae^{bx}, Y= [ ]

a) In y b) log y c) y d) none

20. The value of $\int_1^2 1/x$ dx by Trapezoidal rule(take n=4) is [ ]

a) 0.697 b) 0.589 c) 0.456 d) 56

21. The value of $\int_0^1 1/(1+x)$ dx by simpson's 1/3 rule(take n=4) is [ ]

a) 0.693 b) 0.589 c) 0.456 d) 56

22.In simpson's $\frac{1}{3}$ rule state that $\int_a^b f(x)\,dx$ = [ ]

a) $\frac{h}{2}[(y_0+y_n)+2(y_1+y_2+..........+y_{n-1})]$ b) $\frac{h}{3}[(y_0+y_n)+2(y_1+y_2+.........+y_{n-1})]$

c) $\frac{h}{3}[(y_0+y_n)+2(y_2+y_4+.......)+4(y_1+y_3+....)]$ d)none

23.In simpson's $\frac{3}{8}$ rule state that $\int_a^b f(x)\,dx$ = [ ]

a) $\frac{3h}{8}[(y_0+y_n)+3(y_1+y_2+y_4..........+y_{n-1})+2(y_3+y_6+y_9..........+y_n)$

b) $\frac{h}{3}[(y_0+y_n)+2(y_1+y_2+.........+y_{n-1})]$

c) $\frac{h}{3}[(y_0+y_n)+2(y_2+y_4+.......)+4(y_1+y_3+....)]$ d)none

24.If [ ]

x	1	2	3	4	5
y	14	27	40	55	68

Then ∑xy=........

a)15 b) 204 c)55 d)748

25. The power curve is .... [ ]

a)$y=ax^b$ b) $y=ab^x$ c) $y=ae^b$ d)none

26. The exponential curve is............. [ ]

a)$y=ax^b$ b) $y=ab^x$ c) $y=ae^{bx}$ d)none

27. $y = a\,e^{bx}$ is _______________ curve [ ]

a) exponential b) power c) parabola d) none

28. In simpson's 1/3 rule the number of subintervals should be ____________ [ ]

a) even b) odd c) multiples of 3 d) none

29. Putting n=2 in Newton- cotes Quadrature formula we obtain _________ rule [ ]

a) Trapezoidal b) Simpson's1/3 c) Simpson's 3/8 d) none

30. If y=8.3,Y= logy then Y=……… [ ]

a) 0.9191 b) 9.191 c) 0.0919 d) none

31. If y=4.077,Y= ln(y) then Y=……… [ ]

a) 1.040 b) 1.405 c) 0.4059 d) none

32. If [ ]

x	0	2	5	7
y	-1	5	12	20

Then $\sum x^2$ =……..

a) 79 b) 78 c) 77 d) none

33. If [ ]

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

Then $\sum x$ =……..

a) 10 b) 11 c) 12 d) none

34. If [ ]

x	0	5	10	15	20	25
y	12	15	17	22	24	30

Then $\sum y$ =……..

a) 12 b) 139 c) 120 d) none

35. If [ ]

x	0	1.0	2.0
y	1.0	6.0	17.0

Then n =……..

a) 2 b) 4 c) 3 d) none

36. If $y = a + bx + cx^2$ the second normal equation by least square [ ]

Method is…………

a) $y = a + cx^2$ b) $y = a + bx + cx^2$ c) $y = bx + cx^2$ d) none

37. The Normal equations of the straight line is……… [ ]

a) $y = a_1 x$ b) $y = a_0 + x$ c) $y = a_0 + a_1 x$ d) none

38. If y=ax^2 is .... equation [ ]

a) ellips b) parabola c) hyparbola d) none

39. If y=2x+5 is the best fit for 6 pairs of values (x,y) by the method of least squares, [ ]

find $\sum x_i$ if $\sum y_i$ =120.

a) 40 b) 35 c) 45 d) 30

40. If $y = a + bx + cx^2$ and [ ]

x	0	1	2	3	4
y	1	1.8	3.3	2.5	6.3

Then the second normal equation is

a) 37.1=8a+28b+100c b) 37.1=10a+30b+100c
c) 35.1=10a+28b+100c d) 10a+30b+96c= 37.1

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

QUESTION BANK (DESCRIPTIVE)

Subject with Code : MATHEMATICS-III(15A54301) **Course & Branch**: B.Tech(ECE)

Year & Sem: II-B.Tech & I-Sem

Regulation: R15

UNIT –V

1.a) Tabulate y (0.1), y (0.2), and y (0.3) using **Taylor's series method** given that [5 M]
$y^1 = y^2 + x$ and y(0) = 1

b) Solve $y^1 = x + y$, given y (1)=0 find y(1.1) and y(1.2) by **Taylor's series method** [5 M]

2. Find y(0.1),y(0.2),z(0.1),z(0.2) given $\frac{dy}{dx}$ = x+z , $\frac{dz}{dx}$ = x-y^2 and y(0)=2, [10 M]

Z (0)=1 by using **Taylor's series method** .

3.a) Find the value of y for x=0.4 by **picards method** given that $\frac{dy}{dx}$ = x^2+y^2, y(0)=0 [5 M]

b) Obtain y(0.1) given $y^1 = \frac{y-x}{y+x}$,y(0)=1 by **picards method .** [5 M]

4.a) Given that $\frac{dy}{dx}$ =1+xy and y (0) =1 compute y(0.1),y(0.2) using **picards method** [5 M]

b) Solve y^1= y-x^2 , y (0) =1 by **picards method** upto the fourth approximation. [5 M]

Hence find the value of y (0.1), y (0.2).

5. a) Using **modified Euler's method** find y(0.2) , y(0.4) given y^1= y + e^x, y(0)=0 [5 M]

b) Find the solution of $\frac{dy}{dx}$ = x-y , y(0)=1 at x=0.1, 0.2, 0.3, 0.4, 0.5 using [5 M]

Modified Euler's Method.

6. Given that y^1=x+siny , y(0)=1 compute y(0.2) , y(0.4) with h=0.2 using **Euler's Modified method** [10 M]

7.a) Use **Runge- kutta method** to evaluate y(0.1) and y(0.2) given that y^1=x+y , y(0)=1 [5 M]

b) Find y(0.1) and y(0.2) using **R-K 4^{th} order formula** given that y^1=x^2-y and y(0)=1 [5 M]

8. Using R-K method of 4^{th} order , solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$, y(0)=1 Find y(0.2) and y(0.4) [10 M]

9. a) Use Milne's predictor – corrector method to obtain the solution of the equation [5 M]

y^1=x-y^2 at x=0.8 given that y(0)=0 ,y(0.2)=0.02 ,y(0.4) = 0.0795 ,y(0.6)=0.1762

b) Use **Milne's method** to find y(0.8) , y(1.0) from y^1=1+y^2 , y(0)=0 [5 M]

Find the initial values y(0.2), y(0.4) ,y(0.6)from the R-K method

10. a) Define ODE . [5x2=10M]

b) Write the SFPF formula for Laplace Transforms .

c) Write the formula for R-K method .

d) Write the Milne's predictor – corrector formula.

e) Solve y^1= y-x^2 , y (0) =1 by **picards method** upto the Second approximation.

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

QUESTION BANK (OBJECTIVE)

Subject with Code : MATHEMATICS-III(15A54301) **Course & Branch**: B.Tech(ECE)

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

UNIT – V

1.Successive approximations are used in

a)Milne's method b)Picard's method c)Taylor series method d)none [ ]

2..Which of the following in a step by step method:

a)Taylor's series b)Adam's bashforth c)Picard's d)none [ ]

3.Runge-kutta method is self starting method:

a)true b)false c)we can't say d)none [ ]

4.Predictor-corrector methods are self starting methods:

a)true b)false c)we can't say d)none [ ]

5.The second order Runga-kutta formula is

a)Euler's method b)Newton's method

c) modified euler's method d)none [ ]

6. The following is called predictor-corrector method:

a)Picard's method b)Euler's method

c)Milne's method d)none [ ]

7.Which of the following is best for solving initial value problems.

a)Euler's method b)Modified Euler's method

c)Taylor's series method d)Runge-kutta method of order 4 [ ]

8.In Adam's method atleast values of y,prior to the desired value, are

Required

a)Five b)two c)six d)four [ ]

9.If' 'n' conditions are specified at the initial point ,then it is called [ ]

a)initial value problem b)final value problem

c)boundary value problem d)none

10. If 'n' conditions are specified at two or more points,then it is called

a)initial value problem b)final value problem

c)boundary value problem d)none [ ]

11. To apply milne's method we require ________ prior values of y [ ]

a) 1 b) 2 c) 3 d) 4

12. The first order Runge-Kutta method is = _______________ [ ]

a) Euler's method b)Modifies Euler's method c)Taylor's method d) Picard's method

13. The second order Runge-Kutta formula is y_1 =___________ [ ]

a) $y_0 +(k_1 + k_2)$ b) $y_0 - (k_1 + k_2)$ c) $y_0 +\frac{1}{2}(k_1 + k_2)$ d) $y_0 - \frac{1}{2}(k_1 + k_2)$

14. To apply Fourier series, the function must satisfies ______________ conditions [ ]

a) Euler's b) Dirichlet's c) Laplace d) none

15. The n^{th} difference of a n^{th} degree polynomial is ________________ [ ]

a) Constant b) Zero c) one d) none

16. Successive approximations used in ____________method [ ]

a) Euler's b) Taylor's c) Picard's d) R-K

17.,The taylor's for f(x)=log(1+x) is ……

a)x-$\frac{x^2}{2}$ +$\frac{x^3}{3}$ -……. b) x +$\frac{x^3}{3}$ -……. c) both a and b d)non [ ]

18. The taylor's for solutions of the equations $\frac{dy}{dx}$ = f(x,y),y(x$_0$)=y$_0$ is …… [ ]

a) $y(x)=y_0+(x-x_0)y_0^1+\frac{(x-x_0)^2}{2!}y_0^{11}\ldots\ldots$ b) $y(x)=y_0+\frac{(x-x_0)^2}{2!}y_0^{11}\ldots\ldots\ldots$

c) both a and b d)none

19. Disadvantage of picard's method is……..

a) It can be applied to those equations only in which successive integrations can be performed easily

b)can be applied to those equations only in which successive integrations can be performed difficulty. c) both a and b d)none [ ]

20. The predictor-corrector methods are not ……… methods

a)Picard's method b)Euler's method

c)Milne's method d)self- starting method [ ]

21. The R-K method is a ……………….. method

a)Picard's method b)Euler's method

c)Milne's method d)self- starting method [ ]

22.The fourth order R-K formula is ………………..

a)$y_1=y_0+\frac{1}{6}(k_1+2k_2+2k_3+k_4)$ b) $y_1=y_0+\frac{1}{6}(k_1+2k_3+k_4)$

c) $y_1=y_0+\frac{1}{6}(k_1+2k_2+2k_3)$ d)none [ ]

23. Using Euler's method $y^1=\frac{y-x}{y+x}$,y(0)=1 and h=0.02give y_1=…….

a)0.02 b) 1.02 c) 2.02 d)3.02 [ ]

24.Using Euler's method $y^1=\frac{y-x}{y+x}$,y(0)=1 then the picard's method the value of $y^1(x)$=……… [ ]

a) 1 +2log(1+x) b) 1-x+2log(1+x) c) x+2log(1+x) d)none

25. If $\frac{dy}{dx}$ = x-y and y(0)=1 then by picard's method the value of $y^1(1)$ is … [ ]

a) 0.905 b) 1.905 c) 2.905 d)none

26. If $\frac{dy}{dx}$ = x^2+y^2 ,y(0)= 0 then by picard's method the value of $y^1(x)$ is…. [ ]

a) 1 +2log(1+x) b) 1-x+2log(1+x) c) x+2log(1+x) d)$x^3/3$

27. If $\frac{dy}{dx}$ = x+y ,y(0)= 1and $y^1(x)=1+x+x^2/2$, then by picard's method the value of $y^2(x)$ is……. [ ]

a) $1+x+x^2+x^3/6$ b) $1-x+x^2+x^3/6$ c) x+2log(1+x) d)none

28. If $y_0=1$ h=0.2 ,$f(x_0,y_0)=1$ then by Euler's method the value of y_1=…. [ ]

a) 0.2 b) 1.2 c) 2.2 d)none

29. If y^1=y-x and y(0)= 2 ,h=0.2 then by Euler's method the value of y_1=….. [ ]

a) 0.4 b) 1.4 c) 2.4 d)none

30.If $\frac{dy}{dx}$ = - x,y(0)=1,h=0.01 then by Euler's method the value of y_1=….. [ ]

a) 1.99 b) 2.99 c) 0.99 d)none

31.If y_1=1.02,h=0.02 ,$f(x_1,y_1)$=0.9615 then the value of y_2 by Euler's method is [ ]

a) 1.0577 b) 1.0477 c) 1.0377 d)none

32. if y_1=1.1,h=0.1,$f(x_1,y_1)$=1.2 then by euler's method the value of y_2 is… [ ]

a)0.22 b) 1.22 c)2.22 d)3.222

33.if y_1=1.2,h=0.2, $f(x_1,y_1)$=1.4, then by euler's method the value of y_2 is…… [ ]

a)3.48 b)2.48 c)1.48 d)0.48

34. If $\frac{dy}{dx}$ =$\frac{y-2x}{y}$,y(0)=1 and h=0.1 the the value of y_1 by eulers method is… [ ]

a)1.1813 b)0.1813 c)2.1813 d)3.1813

35.If $\frac{dy}{dx}$ =$\frac{y^2-x^2}{y^2+x^2}$,y(0)=1, h=0.2 then the value of k_1 in fourth order R-K method is.. [ ]

a)0.01 b)0.002 c)0.2 d)0.000002

36. If $\frac{dy}{dx}$ =$x+y^2$, y(0)=1, h=0.1 the value of K_2 in the fourth order R-K method is.. [ ]

a)0.1152 b)0.5211 c)1.5211 d)1.1152

37.If $\frac{dy}{dx}$=x^2+y^2,$f(x_0,y_0)$=1, h=0.1,k_1=0.1,k_2=0.1105 ,k_3=0.1105 and k_4=0.1222 then the value of y(1.1) by fourth order R-K method is…………….. [ ]

a)0.5566 b)0.4488 c)0.1107 d)0.2234

38.If $\frac{dy}{dx}$=x+y,f(x_0,y_0)=1, h=0.2,k_1=0.1,k_2=0.11 ,k_3=0.1105 and k_4=0.12105 then the value of

y(0.2) =…………….. [ ]

a)1.5566 b)1.4488 c)1.1107 d1.2428

39.Given y_0,y_1,y_2,y_3 milne's corrector formula y_4 =……………………. [ ]

a) $y_2+\frac{h}{3}(f_2+4f_3+f_4)$ b) $y_2-\frac{h}{3}(f_2+4f_3+f_4)$ c) $y_2+\frac{h}{3}(f_2-4f_3+f_4)$ d)none

40.Milne's predictor formula y_4=................................... [ ]

a) $y_2+\frac{h}{3}(f_2+4f_3+f_4)$ b) $y_2-\frac{h}{3}(f_2+4f_3+f_4)$ c) $y_0+\frac{4h}{3}(2f_1-f_2+2f_3)$ d)none

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. [5M]

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

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]

Prepared by: K.SUBHASHINI,P.USHA

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

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) ΔE −------------------ [ ]

A) Δ B) ∇ C) δ D)None

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

A) Δ B) $\vee$ 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

Prepared by: K.SUBHASHINI,P.USHA