

RAGHUNATHPUR COLLEGE

U.G. 5th Semester Internal Examination-2020

MATHEMATICS

Course Code: BMTMSERT504

Course Title: Numerical Methods

Full Marks: 50

Time:2Hrs

Answer any twenty five questions.

2x25=50

1. In Regular-falsi method, the first approximation is given by

$$a) x_1 = \frac{af(b) - bf(a)}{f(b) - f(a)} \quad b) x_1 = \frac{bf(b) - af(a)}{f(b) - f(a)} \quad c) x_1 = \frac{bf(a) - af(b)}{f(a) - f(b)} \quad d)$$

$$x_1 = \frac{af(a) - bf(b)}{f(a) - f(b)}$$

2. The order of convergence of Regular-falsi method is

a) 1.235 b) 3.141 c) 1.618 d) 2.792

3. Which of the following alter name for method of false position

a) Method of chords b) Method of tangents c) Method of bisection d) Regula falsi method.

4. The order of convergence in Newton-Raphson method is

a) 2 b) 3 c) 0 d) 1

5. The Newton-Raphson algorithm for finding the cube root of N is

$$a) x_{n+1} = \frac{1}{2} (x_n + N/x_n) \quad b) x_{n+1} = \frac{1}{3} (2x_n - N/x_n^2) \quad c) x_{n+1} = (x_n + N/x_n) \quad d) x_{n+1} = \frac{1}{3} (2x_n + N/x_n^2)$$

6. If x_n is the nth iterate, then the Newton-Raphson formula is

$$a) x_{n+1} = x_n + \frac{f(x_n)}{f'(x_n)} \quad b) x_{n+1} = x_n - \frac{f(x_{n-1})}{f'(x_{n-1})} \quad c) x_{n+1} = x_n - \frac{f(x_{n+1})}{f'(x_{n+1})} \quad d) x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

7. The Newton-Raphson method fails when

a) $f'(x)$ is negative b) $f'(x)$ is too large c) $f'(x)$ is zero d) Never fails.

8. By Gauss Elimination method the value of x and y for the equations $x + y = 2$, $2x + 3y = 5$

a) $x = 2$ and $y = 3$ b) $x = 3$ and $y = 4$ c) $x = 1$ and $y = 1$ d) $x = 2$ and $y = 5$

9. In Gauss elimination the given system of simultaneous equations is transformed into

a) Lower triangular matrix b) Unit matrix c) Transpose matrix d) Upper triangular matrix

10. Interpolation formulae are based on the fundamental assumption that the data can be expressed as

a) A linear function b) A quadratic function c) A polynomial function d) None of the above

11. Using Newton's forward interpolation formula find the value of $f(1.6)$, if

x	1	1.4	1.8	2.2
y	3.49	4.82	5.96	6.5

- a) 5.54 b) 5.45 c) 5.35 d) None of these

12. Which of the following symbol is called forward difference operator

- a) Δ b) ∇ c) δ d) E

13. Divided differences are independent of the _____ of the arguments.

- a) Size b) Functions c) Order d) Value

14. Divided differences method can be used when the given independent variate values are

- a) At equal intervals b) At unequal intervals c) Not well defined d) All the above

15. Lagrange's polynomial for interpolation can be used even if

- a) The given arguments are not equally spaced b) Extrapolation is to be done
c) Inverse interpolation is to be done d) All the above

16. The value of $f(3)$ from the following table using the Lagrange formula is

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

- a) 10 b) 10.5 c) 11 d) 11.5

17. From certain experiment the following data has been obtained

x	1	3	4
y	4	12	19

Use Lagrange's inverse formula to find the value of x for which $y = 7$

- a) 2.124 b) 1.857 c) 2.429 d) 1.946

18. The n^{th} divided differences of a polynomial of the n^{th} degree are

- A) constant B) variable C) equal D) unequal

19. In the Newton's Forward difference formula what is u _____

- a) $u = \frac{x - x_n}{h}$ b) $u = x - x_n$ c) $u = \frac{(x - x_n)^2}{h}$ d) $u = \frac{x - x_0}{h}$

20. In the Newton's Backward difference formula what is $v =$ _____

a) $v = \frac{x_n - x}{h}$

b) $v = x - x_n$

c) $v = \frac{(x - x_n)^2}{h}$

d) $v = \frac{x_0 - x}{h}$

21. In the second derivative using Newton's Forward difference formula, what is the coefficient of $\Delta^4 f(a)$...

e) $\frac{1}{2}$

b) $\frac{11}{2h}$

c) $\frac{11}{12h^2}$

d) $\frac{11}{12}$

22. What is the last approximate number when doing sum of the numbers 2.56, 4.5627, 1.253, 1.0534-

- a) 9.4291 b) 9.43 c) 9.412 d) 9.132

23. Significant figures of 0.0001 is -

- a) one b) two c) three d) four

24. By approximating $5/3$ by 1.6667 the relative error is-

- a) 0.000020 b) 0.000033 c) 0.000012 d) 0.000011

25. In general the ratio of truncation error to that of round off error is

- a) 2:1 b) 1:1 c) 1:2 d) 1:3

26. The convergence of which of the following method is sensitive to starting value?

- a) False position b) Gauss Seidal method c) Newton-Raphson method d) All of the these

27. 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) $x_{n-1} = \frac{1}{2} (x_n - Nx_n)$ c) $x_{n-1} = \frac{1}{2} \left(x_n + \frac{N}{x_n} \right)$ d) $x_{n-1} = \frac{1}{2} (x_n + Nx_n)$

28. The divided differences of $f(x) = C$ is

- a) 0 b) 1 c) 2 d) 3

29. The n-th order divided difference of x^n is

- a) 0 b) 1 c) 2 d) 3

30. If $\Delta^m f(x) = \text{Constant}$ then what is the value of $\Delta^{m+1} f(x)$

- a) 0 b) 1 c) 2 d) 3