U.G. 5th Semester Examination - 2021

MATHEMATICS

Course Code: BMTMSERT504

Course Title: Numerical Methods

Full Marks : 50   Time : 2 Hours

The figures in the right-hand margin indicate marks.

Notations and symbols have their usual meanings.

Answer all the questions by choosing correct alternative:

2×25=50

1. Newton-Raphson method for finding the roots of f(x) will evidently fails if

   a) $f'(x) > 0$ b) $f'(x) = 0$

   c) $f'(x) < 0$ d) All of these

2. π is an

   a) Exact No.   b) Approximate No.

   c) Complex No.   d) None of these

3. Correct upto five significant figures of 13.07357

   a) 13.735   b) 13.073

   c) 13.074   d) None of these

4. How many significant figures are contained in 0.0705?

   a) 2   b) 3

   c) 4   d) 5

5. If a number be rounded off to three decimal places then the absolute error E satisfy the condition

   a) $E \le \frac{1}{2} \times 10^{-3}$ b) $E \le \frac{1}{3} \times 10^{-3}$

   c) $E \le \frac{1}{2} \times 10^{3}$ d) None of these

6. Difference between the approximate nos. 77.4573 and 345.75 is

   a) 268.291   b) 268.293

   c) 268.29   d) None of these

7. If the approximate value is 0.3941 and given absolute error is as 0.25×10^{-2} then the number of significant figures are

   a) 2   b) 3

   c) 4   d) 5

8. If f(x) has at least one real root of f(x)=0 in [a, b] then

   a) $f(a)f(b) > 0$ b) $f(a)f(b) = 0$

   c) $f(a)f(b) < 0$ d) None of these

9. The maximum number of real roots of the equation $x^4 - x^3 - x^2 + x - 1 = 0$ are

a) 0   b) 1

c) 2   d) 3

10. Iteration method is obviously conditionally convergent for the iteration function $\varphi(x)$ if

a) $|\varphi'(x)| < 1$ b) $|\varphi'(x)| > 1$

c) $|\varphi'(x)| > -1$ d) None of these

11. A positive root of the equation $x^3 - x - 1 = 0$ lies between

a) 0 and 1   b) 1 and 2

c) 2 and 3   d) All of these

12. If any number be correct upto n significant figures and K be the first significant figure then relative error E_r is

a) $E_r \geq \dfrac{1}{K \times 10^{n-1}}$ b) $E_r \leq \dfrac{1}{K} \times 10^{n-1}$

c) $E_r \leq \dfrac{K}{10^{n-1}}$ d) $E_r \leq \dfrac{1}{KNo^n}$

13. The order of the iterative process in Newton-Raphson mehod is

a) 1st order   b) 2nd order

c) 3rd order   d) 4th order

14. A system of linear equations Ax=b is said to be homogeneous if

a) b>0   b) b<0

c) b=0   d) $b \neq 0$

15. Gauss elemination method for solving a system of linear equation is a

a) Direct Method   b) Indirect Method

c) Mixed Method   d) None of these

16. Newton's forward formula is used for inerpolating a point in the tabular value as

a) Near the beginning

b) Near the ending

c) Near the middle

d) None of these

17. The error E in Newton's forward formula is numerically

a) E>0   b) E=1

c) E<1   d) None of these

18. Newton's Backward formula is used for the arguments with

a) Equal interval

b) Unequal interval

c) Both equal and unequal

d) None of these

19. The equation $x^2 + 3x + 5 = e^x$ is an example of

a) Transcendental

b) Polynomial

c) Poisson's equation

d) None of these

20. The principle of functional replacement took place in

a) Newton-Raphson

b) Gaussian elimination

c) Interpolation Method

d) None of these

21. The number of correct significant figures in V_A w.r.t V_T where true value V_T=0.05418, Approximate value V_A=0.05418 is

a) 2   b) 3

c) 4   d) 5

22. In Newton-Raphson method if the curve f(x) is constant then _____.

a) f(x)=0   b) $f'(x) = c$

c) $f''(x) = 0$ d) $f'(x) = 0$

23. If ΔA is the absolute error of an approximate value A, turn the percentage error is

a) $\dfrac{\Delta A}{A \times 100}$ b) $\dfrac{\Delta A \times 100}{A}$

c) $\dfrac{A \times 100}{\Delta A}$ d) $\dfrac{A}{\Delta A \times 100}$

24. The solution of the system Ax=b of n equation with n unknown will exists iff

a) Rank $[A] = $ Rank$[Ab] \leq n$

b) Rank $[A] \neq $ Rank$[Ab] \leq n$

c) Rank $[A] > $ Rank$[Ab] \leq n$

d) Rank $[A] < $ Rank$[Ab] \leq n$

25. The relation of E_r = relative error, ΔP = absolute error and p=Approximate value is

a) $\Delta P \times p = E_r$ b) $\Delta P \times E_r = p$

c) $\Delta P = E_r \times p$ d) None of these

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