B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
III Year V Semester
Core Elective - Paper I
NUMERICAL METHODS

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Solve the equations $x-2y=3; 2x+3y=-1$.by Gauss elimination method.
2. Compare the merits and demerits of the elimination method and iterative method in solving linear algebraic equations.
3. What is the order of convergence of Newton-Raphson method?
4. Show that E = 1+Δ
5. What is the difference between interpolation and extrapolation?
6. What is meant by truncation error in interpolation?
7. Explain the principle of least squares fit.
8. What are the desirable characteristics of metrics used for curve fitting method?
9. Mention two practical applications of Simpson's rule for numerical integration.
10. State Trapezoidal rule to evaluate $\int_{x0}^{xn} y(x)dx$.
11. Find the inverse of the following matrix $\begin{pmatrix} cos \propto & sin \propto \\ sin \propto & cos \propto \end{pmatrix}$
12. Write the formula for Newton's forward interpolation scheme.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Solve the equations 2x+y+4z=12; 8x-3y+2z=20; 4x+11y-z=33 by the method of triangularisation.
14. Find the smallest positive root of x2-logex-12=0 by Regula falsi method.
15. Derive Newtons forward interpolation formula.

16. Deduce normal equations for fitting a straight line y=ax+b by the method of least squares.

17. Derive Simpson's 1/3 rule to find the value of $\int_{x0}^{xn} f(x)dx$.

18. Form the difference table for the following data and hence $\Delta^6 y_0$, $\Delta^5 y_1$ and $\Delta^2 y_2$.

x	0	1	2	3	4	5	6
y	2	5	8	20	38	10	3

19. Using Euler's method solve $\frac{dy}{dx} = 1+xy$ with y(0)=2. Find y(0.1) and y(0.2).

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Find the inverse of the matrix A $= \begin{bmatrix} 1 & 2 & 6 \\ 2 & 5 & 15 \\ 6 & 15 & 46 \end{bmatrix}$ by Gauss Elimination method.

21. Find the real root of the equation x3- x-11=0 by using bisection method.

22. Using Newton's forward interpolation formula, find $e^{1.85}$ from the following table

x	1.7	1.8	1.9	2.0	2.1	2.2	2.3
e^x	5.4739	6.0496	6.6859	7.3891	8.1662	9.0250	9.9742

23. Fit the curve $y=ae^{bx}$ to the following data

x	0	2	4
y	5.012	10	31.62

24. Evaluate $\int_0^5 \frac{dx}{4x+5}$ by Trapezoidal rule by dividing the range into 11 equal parts.

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