B.Sc. DEGREE EXAMINATION,APRIL 2019
III Year V Semester
Numerical Methods

Time : 3 Hours **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. Solve the equations $x + y = 2\ and\ 2x + 3y = 5$ by Gauss elimination Method.
2. Find the inverse of the following matrix $\begin{bmatrix} cos \propto & sin \propto \\ sin \propto & cos \propto \end{bmatrix}$
3. Mention the criterion for convergence of Newton- Raphson method?
4. What is the relation between the operators E and D?
5. What is meant by linear interpolation?
6. Write the Newton's backward interpolation formula.
7. Give four types of curves that can be fitted by the principles of least squares.
8. Convert the equation $xa^y = b$ into linear form.
9. When does Simpson's rule give exact result?
10. Write the formula for numerical integration by trapezoidal rule.
11. What are the direct methods of solving a matrix?
12. Prove that $\Delta^3 y_0 = y_3 - 3y_2 + 3y_1 - y_0$

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. Solve the equations $\mathbf{2x+y+4z=12}$; $\mathbf{8x-3y+2z=20}$; $\mathbf{4x+11y-z=33}$ by the method of triangularisation.
14. Write down the procedure for finding the approximate root by bisection method.
15. Using Newton's backward interpolation formula, find y from the following data at $x = 2.65$.

x	*-1*	*0*	*1*	*2*	*3*
y	*-21*	*6*	*15*	*12*	*3*

16. State and explain linear regression.
17. Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ by using Trapezoidal Rule
18. Show that $\Delta^2(\cos 2x) = -4\sin^2 h \cos(2x + 2h)$.
19. Using Euler's method to solve $\frac{\mathbf{dy}}{\mathbf{dx}}=\mathbf{1+xy}$ with $y(0) = 2$. Find y(0.1) and y(0.2).

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

Answer any **THREE** questions

20. By Gauss elimination Find A^{-1} if A= $\begin{pmatrix} 4 & 1 & 2 \\ 2 & 3 & -1 \\ 1 & -2 & 2 \end{pmatrix}$

21. Use Regula Falsi Position method find an approximate root of $x\log_{10}x$ - 1.2 = 0.

22. Find the number of students whose weight is between 60 and 70, from the data given below

Weight	0 - 40	40 - 60	60 - 80	80 - 100	100 - 120
No. of Students	250	120	100	70	50

23. From the table given below, find the best values of a and b in the law $y = ae^{bx}$ (a>0) by the method of least squares.

x	1	2	3	4
y	1.65	2.70	4.50	7.35

24. A curve passes through the points as given in the table. Find

    (i) the area bounded by the curve, the x-axis, x = 1 and x = 9.

    (ii) The volume of the solid generated by revolving the area about the x-axis.

x	1	2	3	4	5	6	7	8	9
Y	0.2	0.7	1	1.3	1.5	1.7	1.9	2.1	2.3

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