



ADITYA DEGREE COLLEGES

* ANDHRA PRADESH *

PRE-FINAL - EXAMINATIONS

III B.SC :: MATHEMATICS - VI BI

ADVANCED NUMERICAL ANALYSIS Max. Marks : 75 M

Date: 26.03.2020

Time:3hrs

SECTION-A

I. Answer any FIVE of the following questions:

5 x 5 = 25 M

1. Write the exponential curve $y = ae^{bx}$ to the following data

x	1	5	7	9	12
y	10	15	12	15	21

2. From the following table, find the value of x for which 'y' is maximum and the find the value of 'y'

x	1.2	1.3	1.4	1.5	1.6
y	0.9320	0.9636	0.9855	0.9975	0.9996

3. Derive Trapezoidal Rule.

4. Solve the equation $2x_1 + x_2 + x_3 = 10$, $3x_1 + 2x_2 + 3x_3 = 18$, $x_1 + 4x_2 + 9x_3 = 16$ by Gauss elimination method.

5. Solve the equations Gauss- Jordan method $10x + y + z = 12$, $2x + 10y + z = 13$ and $x + y + 5z = 7$

6. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Simpson's 3/8 rule

7. Using Euler -Maclaurin's formula that $\sum_{n=1}^n n^2 = \frac{n(n+1)(2n+1)}{6}$

8. Using Taylor's series method, solve the equation $\frac{dy}{dx} = x^2 + y^2$ for $x=0.4$ given that $y=0$ when $x=0$

ADC-RJY

II. Answer the following questions:

5 x 10 = 50 M

9. a) Derive the normal equations to fitting a staright line by the method of least squares.

(Or)

b) Fit a second degree polynomial to the following data by least square method.

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

10. a) Find $\frac{dy}{dx}, \frac{d^2y}{dx^2}$ at $x=0$ using the table

x	0	2	4	6	8	10
f(x)	0	12	248	1284	4080	9980

(Or)

b) Find $f^{-1}(2.5)$ from the following table

x	1.5	1.9	2.5	3.2	4.3	5.9
f(x)	3.375	6.059	13.625	29.368	73.907	196.579

11. a) Evaluate the value of the integral $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's 3/8 rule. Hence obtain the approximate value of π

$3x + 2y + 4z = 7;$
 $2x + y + z = 7$
 $x + 3y + 5z = 2$

(Or)

b) State and prove Simpson's 1/3 rule.

12. a) Solve the equations

by L-U decomposition method.

(Or)

b) Solve the following system of equations

$$27x + 6y - z = 85; 6x + 15y + 2z = 72; x + y + 54z = 110 \text{ by Gauss seidal method.}$$

13.a) Find $y(2.2)$ by using modified Euler's method for $\frac{dy}{dx} = -xy^2$ where $y(2)=1$

(Or)

b) Given $\frac{dy}{dx} = y - x$ with $y(0) = 2$ find $y(0.1) = 2$ and $y(0.2)$ correct to four decimal places by using Rungekutta method.