ADITYA DEGREE COLLEGES

*** ANDHRA PRADESH ***

PRE-FINAL - EXAMINATIONS

III B.SC :: *MATHEMATICS*

Numerical Analysis

Date:

Max. Marks : 75 M

Time: FN

SECTION-A

I. Answer any FIVE of the following questions: 5 x 5 = 25 M

1. Evaluate the sum $S = \sqrt{3} + \sqrt{5} + \sqrt{7}$ to four significant digits and find its absolute and relative errors.
2. Explain Bisection method.
3. Find the real root of the equation $x \log_{10} x = 1.2$ by Newton's -Raphson's method.
4. Prove that (i) $\Delta = E - 1$ (ii) $\nabla = 1 - E^{-1}$ (iii) $E = e^{hD}$
5. Find the missing term in the following data

x	0	1	2	3	4
y	1	3	9	?	81

6. Find f(6); it is given f(o)=-3 , f(1)=6,f(2)=8,f(3)=12 then find third difference being constant
7. Using Newton's backward interpolation formula , find the value of f(7) from the following data

x	0	2	4	6	8
f(x)	7	13	43	45	367

8. If $y_1 = 4$, y_3=12, y_4=19, y_x=7 then find x using lagrange's inverse interpolation formula.

SECTION-B

II. Answer the following questions: 5 x 10 = 50 M

9. a) Define absolute , Relative , percentage error and derive a General error formula.

(Or)

b) (i) If $u = \frac{5xy^2}{z^3}$ then find relative maximum error in u given that $\Delta x = \Delta y = \Delta z = 0.001$ and $x = y = z = 1$

(ii) If $U=3v^7 - 6v$ then find percentage error in U when v =1 and if percentage error in v is 5

10. a) Find a real root of the equation $f(x) = x^3 - 2x - 5 = 0$ by the method of Regula false position up to three decimal places.

(Or)

b) Find a real root of the equation $xe^x = 1$ by iteration method.

11. a) Prove that 1) hD= $\log(1+\Delta)=-\log(1-\nabla)$

2) $\mu^2 = 1 + \delta^2/4 = \sin h^{-1}(\mu\delta)$ 3) $1 + \mu^2\delta^2 = (1+\frac{\delta^2}{2})^2$

(Or)

b) State and prove Newton forward interplation formula.

12. a) State and prove Stirling's interpolation formula

(Or)

b) Using Bessel's formula to find the value of $y_{2.73}$ give that

$y_{2.5} = 0.4938$ $y_{2.6} = 0.4953$
$y_{2.7} = 0.4965$ $y_{2.8} = 0.4974$
$y_{2.9} = 0.4981$ $y_{3.0} = 0.4987$

13.a) State and prove Newton's divided difference formula.

(Or)

b)(i) State and prove Lagrange's interplation formula

i) Find Sin $(\frac{\pi}{6})$ from

x	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$
sin x	0	0.70711	1

using lagrange's interpolation formula