

SRI Y.N.COLLEGE (AUTONOMOUS)–NARSAPUR, W.G.Dt.

(Affiliated to Adikavi Nannaya University)

III B.Sc., Degree Examinations, Mar/Apr 2018

(At the end of 6th Semester)

Regular (2015-18 batch)

MATHEMATICS

Paper – VII

(Numerical Analysis)



Date: 20.03.2018 FN

Duration: 3 hrs

Max Marks:75

PART - I

Answer any FIVE of the following question. Each carries FIVE marks.

5×5=25M

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 a root of the equation $x^2 - 3x + 2 = 0$ by Newton Raphson's method.
4. Prove that a) $E = e^{hD}$ b) $\Delta^r y_k - \nabla^r y_{k+r}$
5. Prove that $\Delta = \frac{1}{2} \delta^2 + \delta \left(1 + \frac{\delta^2}{4}\right)^{\frac{1}{2}}$
6. Derive Newton backward interpolation formula.
7. Construct divided difference table for the following data

x :	4	5	7	10	11	13
f(x):	48	100	294	900	1210	2028
8. Using the inverse lagranges interpolation formula if $y_1=4$, $y_3=12$, $y_4=19$, $y_x=7$ then find the value of x .

PART - II

Answer any FIVE questions. Choosing atleast TWO questions from each Section. Each question carries Ten marks

5×10=50M**SECTION - A**

9. If $U = \frac{5xy^2}{z^3}$ then find relative maximum error in U, given that
 $\Delta x = \Delta y = \Delta z = 0.001$ & $x=y=z=1$
10. Explain types of errors.
11. Find a real root of the equation $x^3 + x^2 - 1 = 0$ by iteration method.
12. Find a real root of the equation $f(x) = x^3 - 2x - 5 = 0$ by the method of false position method.
13. Find a second degree polynomial passes through (0,1) (1,3) (2,7) and (3,13) find the polynomial.

SECTION - B

14. State and prove Newton – Gregory forward interpolation formula.
15. Given $Y_{20} = 24$, $Y_{24} = 32$, $Y_{28} = 35$, $Y_{32} = 40$ find Y_{25} using Bessels formula.
16. State and prove stirlings formula.
17. By lagranges interpolation formula, find $f(4)$ from the following table.

x:	0	1	2	5
y:	2	5	7	8
18. State and Prove Newton divided difference formula.



Date: 26.03.2019 FN

Max Marks:75

Duration:3hrs

PART - IAnswer any FIVE questions. Each question carries FIVE marks.

5 x 5 = 25

1. If $R = \frac{4x^2y^3}{z^4}$ and errors in x, y, z be 0.001, show that the maximum relative error at $x = y = z = 1$ is 0.009.

2. Find the relative error and percentage error in $u = 6v^3 - 3v^4$ at $v = 1.5 \pm 0.0025$.

3. Using Newton-Raphson method, establish the iterative formula $x_{n+1} = \frac{1}{3} \left[2x_n + \frac{N}{x_n^2} \right]$ to calculate the cube root of N.

4. Find the missing term of the following data

x	1	2	3	4	5	6	7
y	2	4	8	-	32	64	128

5. Prove that $\sqrt{1 + \delta^2 \mu^2} = 1 + \frac{1}{2} \delta^2$.

6. If $f(0) = 1, f(1) = 0, f(2) = 5, f(3) = 22, f(4) = 57$ find $f(0.5)$.

7. If $f(x) = \frac{1}{x^2}$, find the divided difference $f(a, b)$ and $f(a, b, c)$.

8. By Lagrange's interpolation formula, find the form of the function given by

x	0	1	2	3	4
f(x)	3	6	11	18	27

PART - II

Answer any FIVE questions. Choosing atleast TWO questions from each section carries 10 marks.

5 x 10 = 50

SECTION - A

9. Find a real root of the equation $f(x) = x^3 - 2x - 5 = 0$ by the method of false position upto three places of decimals.

10. Find a real root of the equation $\cos x = 3x - 1$, correct to three decimal places, using iteration method.

Contd...

11. Find the real root of the equation $x \log_{10} x - 1.2 = 0$ by Newton-Raphson's method.
12. State and prove that fundamental theorem of difference calculus on finite differences.
13. State and prove Newton's forward interpolation formula.

SECTION - B

14. State and prove Gauss forward interpolation formula.
15. Use Stirling's formula to find y_{28} , given $y_{20} = 49225$, $y_{25} = 48316$, $y_{30} = 47236$, $y_{35} = 45926$, $y_{40} = 44306$.
16. Find the function $f(x)$ in powers of $x-1$, given that $f(0) = 8$, $f(1) = 11$, $f(4) = 68$, $f(5) = 123$.
17. By Lagrange's interpolation formula, find the value of y at $x = 10$, given that

x	5	6	9	11
y	12	13	14	16

18. Using Newton's divided difference formula, prove that

$$f(x) = f(0) + x\Delta f(-1) + \frac{(x+1)x}{2!} \Delta^2 f(-1) + \frac{(x+1)x(x-1)}{3!} \Delta^3 f(-2) + \dots$$



III B.Sc., Degree Examinations, September 2020

(At the end of 6th Semester)

Regular (2017 batch), Supplementary (2016 batch)

MATHEMATICS

Paper – VII

(Numerical Analysis)



Date: 14.09.2020 FN

Duration: 3hrs

Max Marks: 75

PART-I

Answer any FIVE questions, each question carries FIVE marks.

5 x 5 = 25M

1. If $R = \frac{4x^2y^3}{z^4}$ and errors in x, y, z are $\Delta x = \Delta y = \Delta z = 0.001$, then compute the relative maximum error in R , when $x = y = z = 1$.
2. If $2/3$ represents approximately by 0.667 find
 - i) Relative error
 - ii) Percentage error
3. Find the positive real root of the equation $x^3 - 3x^2 + 1 = 0$ using Bisection method upto 4 iterations.
4. Find $\Delta^5 f(0)$ using following table.

$x :$	0	1	2	3	4	5
$f(x) :$	3	12	81	200	100	8
5. Prove that $\Delta = \frac{1}{2}\delta^2 + \delta\sqrt{1 + \frac{1}{4}\delta^2}$.
6. State and prove Stirling's formula.
7. If $f(x) = \frac{1}{x^2}$ then find $f(a, b)$ and $f(a, b, c)$.
8. Find 3rd divided difference of the function $f(x) = x^3 + x + 2$ for the arguments $x = 1, 3, 6, 11$ using divided difference table.

PART-II

Answer any FIVE questions. Choosing atleast Two questions from each Section.

5x10=50M

SECTION-A

- 9. Find real root of the equation $x^3 + x^2 - 1 = 0$ by Iterative method upto 3 decimal places.
- 10. Find real root of the equation $x^3 - 2x - 5 = 0$ by Newton-Raphson's method.
- 11. Find real root of the equation $x \log_{10} x = 1.2$ by method of Regula-False.
- 12. State and prove fundamental theorem of difference Calculus on finite differences.
- 13. Using Newton's forward interpolation formula find value of $\sin 52^\circ$ upto four decimals.

x°	45	50	55	60
$\sin x^\circ$	0.7071	0.7660	0.8192	0.8660

SECTION-B

- 14. State and prove Gauss forward Interpolation formula.
 - 15. Apply Bessel's formula to find $f(62.5)$ from the following data.
- | | | | | | | | |
|------|---|------|------|------|------|------|------|
| x | : | 60 | 61 | 62 | 63 | 64 | 65 |
| f(x) | : | 7782 | 7853 | 7924 | 7993 | 8062 | 8129 |
- 16. State and prove Newton's divided difference formula.
 - 17. Given the following data find $f(x)$ as polynomial in powers of $(x-5)$.

x	:	0	2	3	4	7	9
f(x)	:	4	26	58	112	466	922

- 18. By Lagranges interpolation formula find $f(5)$ using

x	:	1	(2) ³	4	8	10
f(x)	:	8	15	19	32	40



Paper Code: 6123

Regd. No

SRI Y.N.COLLEGE (AUTONOMOUS)–NARSAPUR, W.G.Dt.

(Affiliated to Adikavi Nannaya University)

III B.Sc/B.Com/B.B.A/B.A., Degree Examinations, June 2022

(At the end of 6th Semester)

Regular (2019 batch), Supplementary (2018, 2016 batches)

MATHEMATICS

Paper – VII

(Numerical Analysis)



Date: 15.06.2021 FN

Duration: 3hrs

Max Marks: 75

PART-I

Answer any FIVE questions. Each question carries 5 marks.

5 X 5 = 25M

- Evaluate the sum $S = \sqrt{3} + \sqrt{5} + \sqrt{7}$ to four significant digits and find its absolute and relative errors.
- 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 $x = y = z = 1$.
- Using Newton- Raphson method, establish the iterative formula $x_{n+1} = \frac{1}{3} \left(2x_n + \frac{N}{x_n^2} \right)$ to calculate the cube root of N.
- Find the missing term in the following data.

x	0	1	2	3	4
f(x)	1	3	9	?	81

- Using Newton's forward interpolation formula, find the value of f(1.6).

X	1	1.4	1.8	2.2
y	3.49	4.82	5.96	6.5

- State and prove Stirling's difference formula.
- If $f(x) = \frac{1}{x}$ then find f(a,b). where f(a,b) is the first divided difference.
- Find u_3 , given $u_0 = 580$, $u_1 = 556$, $u_2 = 520$, $u_4 = 385$ by Lagrange's interpolation formula.

PART-II

Answer any FIVE questions. Choosing at least TWO questions from each section.

Each question carries 10 marks.

5 x 10 = 50M

SECTION-A

9. Find a real root of the equation $x^3 - 2x - 5 = 0$ by using Regula-falsi method.
10. Find a real root of the equation $x^3 + x^2 - 1 = 0$ by iteration method.
11. Find a real root of the equation $x^3 - 3x - 5 = 0$ by using Newton-Raphson method.
12. State and prove fundamental theorem of difference calculus on finite differences.
13. State and prove Newton's backward interpolation formula.

SECTION-B

14. State and prove Gauss backward interpolation formula.
15. Use Stirling's formula to find y_{28} , given $y_{20} = 49225$, $y_{25} = 48316$, $y_{30} = 47236$, $y_{35} = 45926$, $y_{40} = 44306$.
16. State and prove Newton's Divided difference formula.
17. Using the following data find $f(x)$ as a polynomial in powers of $(x-5)$ by extending the table to include arguments $x = 5$ repeated as many times as may be necessary
 $f(0) = 4$, $f(2) = 26$, $f(3) = 58$, $f(4) = 112$, $f(7) = 466$, $f(9) = 922$.
18. State and Prove Lagrange's interpolation formula.