Government College of Engineering, Amravati

(An Autonomous Institute of Government of Maharashtra)

Fourth Semester B. Tech. (CS/IT)

Summer – 2018

Course Code: CSU 401

Course Name: Numerical Methods & Computer Programming

Time: 2 Hrs. 30 Min. **Max. Marks: 60**

Instructions to Candidate

1) All questions are compulsory.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Diagrams/sketches should be given wherever necessary.
4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5) Figures to the right indicate full marks.

1. **Solve any two:**

a) Find the root of equation $x-5\log_e x=0$ with starting value $x_0=1.3$ using regula-falsi method. **6**

b) Use fixed – point iteration method to evaluate root of equation $x^2-x-1=0$ using following form of g(x) $X = x^2-1$ **6**

c) Prove the Newton – Raphson method to evaluate $x-1.5\sin x-2.5 = 0$ to four decimal places. **6**

2. **Solve:**

a) Solve by Gauss Jordan Method : $3x+4y+5z = 18$; $2x-y+8z = 13$; $5x-2y+7z = 20$. **6**

Contd..

[OR]

b) Find a Lagrange's interpolating polynomial for data given below
$x_0=1, x_1=2.5, x_2=4, x_3=5.5$
$f(x_0)=4, f(x_1)=7.5, f(x_2)=13, f(x_3)=17.5$ 6

c) The distance covered by athelete for the 50 metre race is given in the following table

Time	0	1	2	3	4	5	6
Distance	0	2.5	8.5	15.5	24.5	36.5	50

Determine speed of the athelete at t=5 sec correct to 2 decimal. 6

3. **Solve any two**

a) Find the first & second derivatives for the function tabulated below at a point x=3.0 6

x	3	3.2	3.4	3.6	3.8	4.0
y	-14	-10.032	-5.296	0.256	6.672	14

b) Table gives the value of tan x for $0.10 \le x \le 0.30$ 6

x	0.10	0.15	0.20	0.25	0.30
y	0.1003	0.1511	0.2027	0.2553	0.3093

Find tan 0.26

c) A die is thrown 8 times & it is required to find probability that 3 will show- 6
i) Exactly 2 times ii) At least once

4. **Solve**

a) From the following table find y when x=1.84 6

x	1.7	1.8	1.9	2.0	2.1	2.2	2.3
y	5.474	6.050	6.686	7.389	8.166	9.025	9.97

b) Find the value of $\int_3^7 x^2 \log x dx$ by taking 4 strips. 6

$\frac{7-3}{4} = h.$

5. **Solve:**

a) Find mean, median, mode, M.D & S.D for the following data 6

x	1	2	3	4	5	6	7	8	9
y	8	10	11	16	20	25	15	9	6

b) Determine the constants a & b by the method of least squares such that $y=ae^{bx}$ fits the following data. 6

x	2	4	6	8	10
y	4.077	11.084	30.128	81.897	222.62

Government College of Engineering, Amravati

(An Autonomous Institute of Government of Maharashtra)

Fourth Semester B. Tech. (CS/IT)

Summer – 2018

Course Code: CSU 401

Course Name: Numerical Methods & Computer Programming

Time: 2 Hrs. 30 Min. **Max. Marks: 60**

Instructions to Candidate

1) All questions are compulsory.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Diagrams/sketches should be given wherever necessary.
4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5) Figures to the right indicate full marks.

1. **Solve any two:**

a) Find the root of equation $x-5\log_e x=0$ with starting value $x_0=1.3$ using regula-falsi method. **6**

b) Use fixed – point iteration method to evaluate root of equation $x^2-x-1=0$ using following form of g(x) $X = x^2-1$ **6**

c) Prove the Newton – Raphson method to evaluate $x-1.5\sin x-2.5 = 0$ to four decimal places. **6**

2. **Solve:**

a) Solve by Gauss Jordan Method : $3x+4y+5z = 18$; $2x-y+8z = 13$; $5x-2y+7z = 20$. **6**

Contd..

[OR]

b) Find a Lagrange's interpolating polynomial for data given below
$x_0=1, x_1=2.5, x_2=4, x_3=5.5$
$f(x_0)=4, f(x_1)=7.5, f(x_2)=13, f(x_3)=17.5$ 6

c) The distance covered by athelete for the 50 metre race is given in the following table

Time	0	1	2	3	4	5	6
Distance	0	2.5	8.5	15.5	24.5	36.5	50

Determine speed of the athelete at t=5 sec correct to 2 decimal. 6

3. **Solve any two**

a) Find the first & second derivatives for the function tabulated below at a point x=3.0 6

x	3	3.2	3.4	3.6	3.8	4.0
y	-14	-10.032	-5.296	0.256	6.672	14

b) Table gives the value of tan x for $0.10 \leq x \leq 0.30$ 6

x	0.10	0.15	0.20	0.25	0.30
y	0.1003	0.1511	0.2027	0.2553	0.3093

Find tan 0.26

c) A die is thrown 8 times & it is required to find probability that 3 will show- 6
i) Exactly 2 times ii) At least once

4. **Solve** 6

a) From the following table find y when x=1.84

x	1.7	1.8	1.9	2.0	2.1	2.2	2.3
y	5.474	6.050	6.686	7.389	8.166	9.025	9.97

b) Find the value of $\int_3^7 x^2 \log x dx$ by taking 4 strips. 6

5. **Solve:**

a) Find mean, median, mode, M.D & S.D for the following data **6**

x	1	2	3	4	5	6	7	8	9
y	8	10	11	16	20	25	15	9	6

b) Determine the constants a & b by the method of least squares such that $y=ae^{bx}$ fits the following data. **6**

x	2	4	6	8	10
y	4.077	11.084	30.128	81.897	222.62