

Code.No: R05012101

R05

SET-1

I B.TECH – EXAMINATIONS, JUNE - 2011
NUMERICAL METHODS
(AERONAUTICAL ENGINEERING)

Time: 3hours**Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

- - -

- 1.a) Explain about Newton-Raphson Method.
 b) Find a double root of the equation $f(x) = x^3 - x^2 - x + 1 = 0$.
 c) Given that the equation $x^{2.2} = 69$ has a root between 5 and 8. Use the method of Regula Falsi. [16]

- 2.a) Using Newton's forward difference formula find the sum $S_n = 1^3 + 2^3 + 3^3 + \dots + n^3$.
 b) Using Gauss-Backward formula find the value of $\sqrt{12516}$ given that $\sqrt{12500} = 111.8033$; $\sqrt{12510} = 111.8482$; $\sqrt{12520} = 111.8928$; $\sqrt{12530} = 111.9375$. [8+8]

- 3.a) Fit the curve $y = ax^b$ to the data

x	1	2	3	4	5	6
y	1200	900	600	200	110	50

- b) Fit a second degree polynomial to the data [8+8]

x	0	1	2	3	4	5	6
y	14	18	23	29	36	40	46

4. Fit a normal cubic B-spline, 's', to the data -2, -1, 0, 1, 2. Show also that 's' is unique if s(t) is prescribed. [16]
- 5.a) A rod is rotating in a plane. The following table gives the angle θ through which the rod has turned for various values of the time 't' in seconds. Find the angular velocity of the rod when $\tau = 0.6$

x	0	0.2	0.4	0.6	0.8	1.0	1.2
y	0	0.122	0.493	1.123	2.022	3.200	4.666

- b) Compute the value of $\int_0^1 \frac{dx}{1+x^2}$ by using the Trapezoidal rule with $h = 0.125$. [8+8]

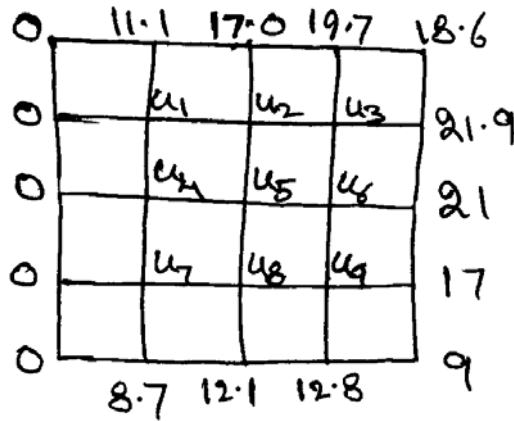
- 6.a) Find the rank of $\begin{bmatrix} 2 & -1 & 3 & 2 \\ 1 & 4 & -2 & 5 \\ 5 & 2 & 4 & 1 \\ 1 & -1 & 2 & -1 \end{bmatrix}$.

- b) Solve $x + 3y + 8z = 4$; $x + 4y + 3z = -2$; $x + 3y + 4z = 1$ by LU-decomposition method. [8+8]

7. Use Milne's Predictor-Corrector Method to find $y(0.3)$, given that

$$y' = \frac{1}{x+y}, \quad y(0) = 1, \quad h = 0.1. \quad [16]$$

8. Solve the Laplace equation $\nabla^2 u = 0$ at the interior points of the square given in figure [16]



FIRSTRANKER

Code.No: R05012101

R05

SET-2

I B.TECH – EXAMINATIONS, JUNE - 2011
NUMERICAL METHODS
(AERONAUTICAL ENGINEERING)

Time: 3hours**Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

- 1.a) Fit the curve
- $y = ax^b$
- to the data

x	1	2	3	4	5	6
y	1200	900	600	200	110	50

- b) Fit a second degree polynomial to the data

[8+8]

x	0	1	2	3	4	5	6
y	14	18	23	29	36	40	46

2. Fit a normal cubic B-spline, 's', to the data -2, -1, 0, 1, 2. Show also that 's' is unique if s(t) is prescribed. [16]

- 3.a) A rod is rotating in a plane. The following table gives the angle
- θ
- through which the rod has turned for various values of the time 't' in seconds. Find the angular velocity of the rod when
- $\tau = 0.6$

x	0	0.2	0.4	0.6	0.8	1.0	1.2
y	0	0.122	0.493	1.123	2.022	3.200	4.666

- b) Compute the value of
- $\int_0^1 \frac{dx}{1+x^2}$
- by using the Trapezoidal rule with
- $h = 0.125$
- . [8+8]

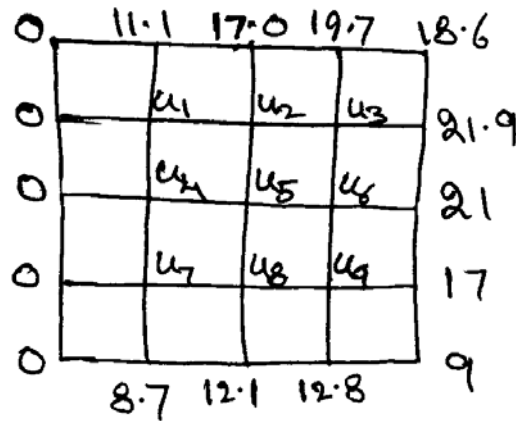
- 4.a) Find the rank of
- $\begin{bmatrix} 2 & -1 & 3 & 2 \\ 1 & 4 & -2 & 5 \\ 5 & 2 & 4 & 1 \\ 1 & -1 & 2 & -1 \end{bmatrix}$
- .

- b) Solve
- $x + 3y + 8z = 4$
- ;
- $x + 4y + 3z = -2$
- ;
- $x + 3y + 4z = 1$
- by LU-decomposition method. [8+8]

5. Use Milne's Predictor-Corrector Method to find
- $y(0.3)$
- , given that

$$y' = \frac{1}{x+y}, \quad y(0) = 1, \quad h = 0.1. \quad [16]$$

6. Solve the Laplace equation $\nabla^2 u = 0$ at the interior points of the square given in figure [16]



- 7.a) Explain about Newton-Raphson Method.
 b) Find a double root of the equation $f(x) = x^3 - x^2 - x + 1 = 0$.
 c) Given that the equation $x^{2.2} = 69$ has a root between 5 and 8. Use the method of Regula Falsi. [16]
- 8.a) Using Newton's forward difference formula find the sum $S_n = 1^3 + 2^3 + 3^3 + \dots + n^3$.
 b) Using Gauss-Backward formula find the value of $\sqrt{12516}$ given that $\sqrt{12500} = 111.8033$; $\sqrt{12510} = 111.8482$; $\sqrt{12520} = 111.8928$; $\sqrt{12530} = 111.9375$. [8+8]

Code.No: R05012101

R05

SET-3

I B.TECH – EXAMINATIONS, JUNE - 2011
NUMERICAL METHODS
(AERONAUTICAL ENGINEERING)

Time: 3hours

Max.Marks:80

Answer any FIVE questions
All questions carry equal marks

- 1.a) A rod is rotating in a plane. The following table gives the angle θ through which the rod has turned for various values of the time 't' in seconds. Find the angular velocity of the rod when $\tau = 0.6$

x	0	0.2	0.4	0.6	0.8	1.0	1.2
y	0	0.122	0.493	1.123	2.022	3.200	4.666

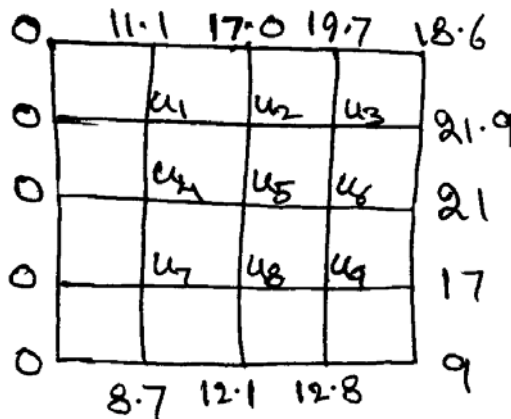
- b) Compute the value of $\int_0^1 \frac{dx}{1+x^2}$ by using the Trapezoidal rule with $h = 0.125$. [8+8]

- 2.a) Find the rank of $\begin{bmatrix} 2 & -1 & 3 & 2 \\ 1 & 4 & -2 & 5 \\ 5 & 2 & 4 & 1 \\ 1 & -1 & 2 & -1 \end{bmatrix}$.

- b) Solve $x + 3y + 8z = 4$; $x + 4y + 3z = -2$; $x + 3y + 4z = 1$ by LU-decomposition method. [8+8]

3. Use Milne's Predictor-Corrector Method to find $y(0.3)$, given that $y' = \frac{1}{x+y}$, $y(0) = 1$, $h = 0.1$. [16]

4. Solve the Laplace equation $\nabla^2 u = 0$ at the interior points of the square given in figure [16]



- 5.a) Explain about Newton-Raphson Method.
 b) Find a double root of the equation $f(x) = x^3 - x^2 - x + 1 = 0$.
 c) Given that the equation $x^{2.2} = 69$ has a root between 5 and 8. Use the method of Regula Falsi. [16]
- 6.a) Using Newton's forward difference formula find the sum $S_n = 1^3 + 2^3 + 3^3 + \dots + n^3$.
 b) Using Gauss-Backward formula find the value of $\sqrt{12516}$ given that $\sqrt{12500} = 111.8033$; $\sqrt{12510} = 111.8482$; $\sqrt{12520} = 111.8928$; $\sqrt{12530} = 111.9375$. [8+8]
- 7.a) Fit the curve $y = ax^b$ to the data
- | | | | | | | |
|---|------|-----|-----|-----|-----|----|
| x | 1 | 2 | 3 | 4 | 5 | 6 |
| y | 1200 | 900 | 600 | 200 | 110 | 50 |
- b) Fit a second degree polynomial to the data [8+8]
- | | | | | | | | |
|---|----|----|----|----|----|----|----|
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| y | 14 | 18 | 23 | 29 | 36 | 40 | 46 |
8. Fit a normal cubic B-spline, 's', to the data -2, -1, 0, 1, 2. Show also that 's' is unique if s(t) is prescribed. [16]

Code.No: R05012101

R05

SET-4

I B.TECH – EXAMINATIONS, JUNE - 2011
NUMERICAL METHODS
(AERONAUTICAL ENGINEERING)

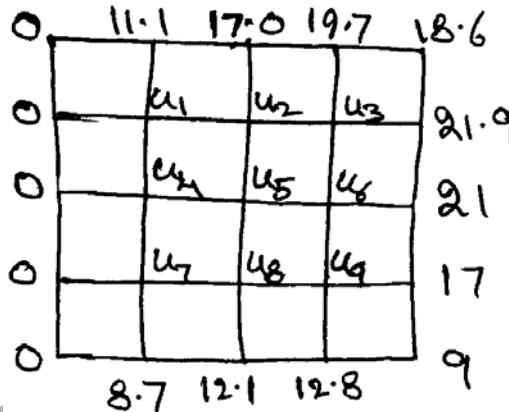
Time: 3hours

Max.Marks:80

Answer any FIVE questions
 All questions carry equal marks

1. Use Milne's Predictor-Corrector Method to find $y(0.3)$, given that
 $y' = \frac{1}{x+y}$, $y(0) = 1$, $h = 0.1$. [16]

2. Solve the Laplace equation $\nabla^2 u = 0$ at the interior points of the square given in figure [16]



- 3.a) Explain about Newton-Raphson Method.
 b) Find a double root of the equation $f(x) = x^3 - x^2 - x + 1 = 0$.
 c) Given that the equation $x^{2.2} = 69$ has a root between 5 and 8. Use the method of Regula Falsi. [16]

- 4.a) Using Newton's forward difference formula find the sum
 $S_n = 1^3 + 2^3 + 3^3 + \dots + n^3$.
 b) Using Gauss-Backward formula find the value of $\sqrt{12516}$ given that
 $\sqrt{12500} = 111.8033$; $\sqrt{12510} = 111.8482$; $\sqrt{12520} = 111.8928$; $\sqrt{12530} = 111.9375$. [8+8]

- 5.a) Fit the curve $y = ax^b$ to the data

x	1	2	3	4	5	6
y	1200	900	600	200	110	50

- b) Fit a second degree polynomial to the data [8+8]

x	0	1	2	3	4	5	6
y	14	18	23	29	36	40	46

6. Fit a normal cubic B-spline, 's', to the data -2, -1, 0, 1, 2. Show also that 's' is unique if s(t) is prescribed. [16]

7.a) A rod is rotating in a plane. The following table gives the angle θ through which the rod has turned for various values of the time 't' in seconds. Find the angular velocity of the rod when $\tau = 0.6$

x	0	0.2	0.4	0.6	0.8	1.0	1.2
y	0	0.122	0.493	1.123	2.022	3.200	4.666

b) Compute the value of $\int_0^1 \frac{dx}{1+x^2}$ by using the Trapezoidal rule with $h = 0.125$. [8+8]

8.a) Find the rank of $\begin{bmatrix} 2 & -1 & 3 & 2 \\ 1 & 4 & -2 & 5 \\ 5 & 2 & 4 & 1 \\ 1 & -1 & 2 & -1 \end{bmatrix}$.

b) Solve $x + 3y + 8z = 4$; $x + 4y + 3z = -2$; $x + 3y + 4z = 1$ by LU-decomposition method. [8+8]
