Code.No: R05010202 | R05 | SET-1

I B.TECH – EXAMINATIONS, JUNE - 2011
MATHEMATICAL METHODS
(COMMON TO EEE, ECE, CSE, EIE, IT, ICE)

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

Answer any FIVE questions
All questions carry equal marks
- - -

1.a) Apply Newton Raphson method to find an approximate root, correct to three decimal places, of the equation $x^3 - 3x - 5 = 0$, which lies near $x = 2$.

b) Using Gauss's Forward Interpolation formula estimate f(32), given f(25) = 0.2707, f(30) = 0.3027, f(35) = 0.3386, f(40) = 0.3794. [16]

2.a) Evaluate the following integrals by Simpson's one-third rule $\int_0^3 \cos^2 x dx, (n = 6)$

b) A rocket is launched from the ground. Its acceleration is registered during the first 80 seconds and is given in the table below. Using Simpson's $1/3$ rule, find the velocity of the rocket at t = 80 seconds. [16]

t(sec)	0	10	20	30	40	50	60	70	80
f(cm/sec^2)	30	31.63	33.34	35.47	37.75	40.33	43.25	46.69	50.67

3. Use Milne's method to find y(0.3) from $y' = x^2 + y^2$, $y(0) = 1$. Find the initial values y(-0.1), y(0.1) and y(0.2) from the Taylor's series method. [16]

4.a) By reducing the marks $\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$ in to normal form, find its rank.

b) Find an LU decomposition of the matrix A and solve the linear system AX = B.

$$\begin{bmatrix} -3 & 12 & -6 \\ 1 & -2 & 2 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -33 \\ 7 \\ -1 \end{bmatrix}.$$ [16]

5.a) Find the characteristic roots of the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ and the corresponding eigen vectors.

b) Find the inverse of the matrix $\begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & 1 \\ 2 & 1 & 2 \end{bmatrix}$ by using Cayley-Hamiltom Theorem.

[16]

6. Find the eigen vectors of the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ and hence reduce $6x^2 + 3y^2 + 3z^2 - 2yz + 4zx - 4xy$ to a sum of squares. [16]

7.a) Expand f(x) = e^{-x} as a Fourier Series in the interval (-1, 1).

b) $F\{x^n f(x)\} = (-i)^n \frac{d^n}{dP^n}[F(P)]$. [16]

8.a) Solve $p^2 + q^2 = x^2 + y^2$.

b) Find the Z – transform of $n^2 e^{n\theta}$. [16]

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Code.No: R05010202 | R05 | SET-2

I B.TECH – EXAMINATIONS, JUNE - 2011
MATHEMATICAL METHODS
(COMMON TO EEE, ECE, CSE, EIE, IT, ICE)

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

Answer any FIVE questions
All questions carry equal marks
- - -

1. Use Milne's method to find y(0.3) from $y' = x^2 + y^2$, $y(0) = 1$. Find the initial values y(-0.1), y(0.1) and y(0.2) from the Taylor's series method. [16]

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b) Find an LU decomposition of the matrix A and solve the linear system AX = B.
$\begin{bmatrix} -3 & 12 & -6 \\ 1 & -2 & 2 \\ 0 & 1 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -33 \\ 7 \\ -1 \end{bmatrix}$. [16]

3.a) Find the characteristic roots of the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ and the corresponding eigen vectors.

b) Find the inverse of the matrix $\begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & 1 \\ 2 & 1 & 2 \end{bmatrix}$ by using Cayley-Hamiltom Theorem. [16]

4. Find the eigen vectors of the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ and hence reduce $6x^2 + 3y^2 + 3z^2 - 2yz + 4zx - 4xy$ to a sum of squares. [16]

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6.a) Solve $p^2 + q^2 = x^2 + y^2$.

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7.a) Apply Newton Raphson method to find an approximate root, correct to three decimal places, of the equation $x^3 - 3x - 5 = 0$, which lies near $x = 2$.

b) Using Gauss's Forward Interpolation formula estimate f(32), given f(25) = 0.2707, f(30) = 0.3027, f(35) = 0.3386, f(40) = 0.3794. [16]

8.a) Evaluate the following integrals by Simpson's one-third rule $\int_0^3 \cos^2 x dx, (n = 6)$

b) A rocket is launched from the ground. Its acceleration is registered during the first 80 seconds and is given in the table below. Using Simpson's 1/3 rule, find the velocity of the rocket at t = 80 seconds. [16]

t(sec)	0	10	20	30	40	50	60	70	80
f(cm/sec^2)	30	31.63	33.34	35.47	37.75	40.33	43.25	46.69	50.67

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Code.No: R05010202 | R05 | SET-3

I B.TECH – EXAMINATIONS, JUNE - 2011
MATHEMATICAL METHODS
(COMMON TO EEE, ECE, CSE, EIE, IT, ICE)

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

Answer any FIVE questions
All questions carry equal marks

- - -

1.a) Find the characteristic roots of the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ and the corresponding eigen vectors.

b) Find the inverse of the matrix $\begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & 1 \\ 2 & 1 & 2 \end{bmatrix}$ by using Cayley-Hamiltom Theorem. [16]

2. Find the eigen vectors of the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ and hence reduce $6x^2 + 3y^2 + 3z^2 - 2yz + 4zx - 4xy$ to a sum of squares. [16]

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8.a) By reducing the marks $\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$ in to normal form, find its rank.

b) Find an LU decomposition of the matrix A and solve the linear system AX = B.

$$\begin{bmatrix} -3 & 12 & -6 \\ 1 & -2 & 2 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -33 \\ 7 \\ -1 \end{bmatrix}.$$ [16]

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Code.No: R05010202 | R05 | SET-4

I B.TECH – EXAMINATIONS, JUNE - 2011
MATHEMATICAL METHODS
(COMMON TO EEE, ECE, CSE, EIE, IT, ICE)

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

Answer any FIVE questions
All questions carry equal marks

\- - -

1.a) Expand f(x) = e^{-x} as a Fourier Series in the interval (-1, 1).

b) $F\{x^n f(x)\} = (-i)^n \frac{d^n}{dP^n}[F(P)]$. [16]

2.a) Solve $p^2 + q^2 = x^2 + y^2$.

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3.a) Apply Newton Raphson method to find an approximate root, correct to three decimal places, of the equation $x^3 - 3x - 5 = 0$, which lies near $x = 2$.

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b) A rocket is launched from the ground. Its acceleration is registered during the first 80 seconds and is given in the table below. Using Simpson's $\frac{1}{3}$ rule, find the velocity of the rocket at t = 80 seconds. [16]

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b) Find an LU decomposition of the matrix A and solve the linear system AX = B.

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[16]

8. Find the eigen vectors of the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ and hence reduce $6x^2 + 3y^2 + 3z^2 - 2yz + 4zx - 4xy$ to a sum of squares. [16]

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