

Code No: 07A3BS01

R07**Set No. 2****II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010****MATHEMATICS - II**

Common to CE, CHEM, AE, BT, MMT

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

Answer any FIVE Questions
All Questions carry equal marks

- Find the Z - transform of 2^{2n+1}
 - Find $z^{-1} \left[\frac{z^2}{(z-1)(z-3)} \right]$ [8+8]
- Verify Caylay - Hamilton theorem and find the inverse of the matrix $\begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$ [16]
- Form the partial differential equation by eliminating the arbitrary functions from $Z = f(x + y + z, x^2 + y^2 + z^2)$
 - Form the partial differential equation by eliminating the arbitrary functions from $xy + yz + zx = f\left(\frac{z}{x+y}\right)$ [8+8]
- A square plate is bounded by the lines $x = 0$, $y = 0$, $x = 20$ and $y = 20$. Its faces are insulated. The temperature along upper horizontal edge is given by $a(x, 20) = x(20 - x)$ when $0 < x < 20$. While the other three edges are kept at 0°C . Find the steady state temperature in the plate. [16]
- Expand the function $f(x) = -x$ if $-4 \leq x \leq 0$
 $= x$ if $0 \leq x \leq 4$ a Fourier series
 - If $f(x) = \pi x$, $0 < x < 1$
 $= \pi(2 - x)$, $1 < x < 2$.
Find Fourier series in $(0, 2)$ [8+8]
- Show that the matrix $\begin{bmatrix} 3 & 7-4i & -2+5i \\ 7+4i & -2 & 3+i \\ -2-5i & 3-i & 4 \end{bmatrix}$ is a Hermitian matrix.
 - If $A = \begin{bmatrix} 0 & 1+2i \\ -1+2i & 0 \end{bmatrix}$ Show that $(I - A)(I + A)^{-1}$ is a Unitary matrix. [8+8]
- Find the rank of the matrix by reducing it to the normal form $\begin{bmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$

Code No: 07A3BS01

R07**Set No. 2**

(b) Find the rank of the matrix by reducing it to the Echelon form $\begin{bmatrix} 8 & 1 & 3 & 6 \\ 0 & 3 & 2 & 2 \\ -8 & -1 & -3 & 4 \end{bmatrix}$ [8+8]

8. (a) Find the Fourier Cosine transform of e^{-x^2} is reciprocal.

(b) Find the Fourier sine transform of $\frac{1}{x}$ [8+8]

FIRSTRANKER

Code No: 07A3BS01

R07**Set No. 4****II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010****MATHEMATICS - II**

Common to CE, CHEM, AE, BT, MMT

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Find the Fourier Cosine transform of e^{-x^2} is reciprocal.
(b) Find the Fourier sine transform of $\frac{1}{x}$ [8+8]
2. A square plate is bounded by the lines $x = 0$, $y = 0$, $x = 20$ and $y = 20$. Its faces are insulated. The temperature along upper horizontal edge is given by $a(x, 20) = x(20 - x)$ when $0 < x < 20$. While the other three edges are kept at 0°C . Find the steady state temperature in the plate. [16]
3. (a) Show that the matrix $\begin{bmatrix} 3 & 7-4i & -2+5i \\ 7+4i & -2 & 3+i \\ -2-5i & 3-i & 4 \end{bmatrix}$ is a Hermitian matrix.
(b) If $A = \begin{bmatrix} 0 & 1+2i \\ -1+2i & 0 \end{bmatrix}$ Show that $(I - A)(I + A)^{-1}$ is a Unitary matrix. [8+8]
4. (a) Find the rank of the matrix by reducing it to the normal form $\begin{bmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$
(b) Find the rank of the matrix by reducing it to the Echelon form $\begin{bmatrix} 8 & 1 & 3 & 6 \\ 0 & 3 & 2 & 2 \\ -8 & -1 & -3 & 4 \end{bmatrix}$ [8+8]
5. (a) Expand the function $f(x) = -x$ if $-4 \leq x \leq 0$
 $= x$ if $0 \leq x \leq 4$ a Fourier series
(b) If $f(x) = \pi x$, $0 < x < 1$
 $= \pi(2 - x)$, $1 < x < 2$.
Find Fourier series in $(0, 2)$ [8+8]
6. (a) Form the partial differential equation by eliminating the arbitrary functions from
 $Z = f(x + y + z, x^2 + y^2 + z^2)$
(b) Form the partial differential equation by eliminating the arbitrary functions from $xy + yz + zx = f\left(\frac{z}{x+y}\right)$ [8+8]
7. (a) Find the Z - transform of 2^{2n+1}

Code No: 07A3BS01

R07**Set No. 4**

(b) Find $z^{-1} \left[\frac{z^2}{(z-1)(z-3)} \right]$ [8+8]

8. Verify Caylay - Hamilton theorem and find the inverse of the matrix $\begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$ [16]

FIRSTRANKER

Code No: 07A3BS01

R07**Set No. 1****II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010****MATHEMATICS - II**

Common to CE, CHEM, AE, BT, MMT

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Verify Caylay - Hamilton theorem and find the inverse of the matrix $\begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$ [16]
2. (a) Find the Z - transform of 2^{2n+1}
(b) Find $z^{-1} \left[\frac{z^2}{(z-1)(z-3)} \right]$ [8+8]
3. A square plate is bounded by the lines $x = 0$, $y = 0$, $x = 20$ and $y = 20$. Its faces are insulated. The temperature along upper horizontal edge is given by $a(x, 20) = x(20 - x)$ when $0 < x < 20$. While the other three edges are kept at 0°C . Find the steady state temperature in the plate. [16]
4. (a) Form the partial differential equation by eliminating the arbitrary functions from $Z = f(x + y + z, x^2 + y^2 + z^2)$
(b) Form the partial differential equation by eliminating the arbitrary functions from $xy + yz + zx = f\left(\frac{z}{x+y}\right)$ [8+8]
5. (a) Find the rank of the matrix by reducing it to the normal form $\begin{bmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$
(b) Find the rank of the matrix by reducing it to the Echelon form $\begin{bmatrix} 8 & 1 & 3 & 6 \\ 0 & 3 & 2 & 2 \\ -8 & -1 & -3 & 4 \end{bmatrix}$ [8+8]
6. (a) Find the Fourier Cosine transform of e^{-x^2} is reciprocal.
(b) Find the Fourier sine transform of $\frac{1}{x}$ [8+8]
7. (a) Show that the matrix $\begin{bmatrix} 3 & 7-4i & -2+5i \\ 7+4i & -2 & 3+i \\ -2-5i & 3-i & 4 \end{bmatrix}$ is a Hermitian matrix.
(b) If $A = \begin{bmatrix} 0 & 1+2i \\ -1+2i & 0 \end{bmatrix}$ Show that $(I - A)(I + A)^{-1}$ is a Unitary matrix. [8+8]

Code No: 07A3BS01

R07**Set No. 1**

8. (a) Expand the function $f(x) = -x$ if $-4 \leq x \leq 0$
 $= x$ if $0 \leq x \leq 4$ a Fourier series

- (b) If $f(x) = \pi x$, $0 < x < 1$
 $= \pi(2 - x)$, $1 < x < 2$.

Find Fourier series in $(0, 2)$

[8+8]

FIRSTRANKER

Code No: 07A3BS01

R07**Set No. 3****II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010****MATHEMATICS - II**

Common to CE, CHEM, AE, BT, MMT

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Show that the matrix $\begin{bmatrix} 3 & 7-4i & -2+5i \\ 7+4i & -2 & 3+i \\ -2-5i & 3-i & 4 \end{bmatrix}$ is a Hermitian matrix.
 (b) If $A = \begin{bmatrix} 0 & 1+2i \\ -1+2i & 0 \end{bmatrix}$ Show that $(I - A)(I + A)^{-1}$ is a Unitary matrix. [8+8]
2. Verify Caylay - Hamilton theorem and find the inverse of the matrix $\begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$ [16]
3. (a) Find the rank of the matrix by reducing it to the normal form $\begin{bmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$
 (b) Find the rank of the matrix by reducing it to the Echelon form $\begin{bmatrix} 8 & 1 & 3 & 6 \\ 0 & 3 & 2 & 2 \\ -8 & -1 & -3 & 4 \end{bmatrix}$ [8+8]
4. (a) Find the Fourier Cosine transform of e^{-x^2} is reciprocal.
 (b) Find the Fourier sine transform of $\frac{1}{x}$ [8+8]
5. A square plate is bounded by the lines $x = 0$, $y = 0$, $x = 20$ and $y = 20$. Its faces are insulated. The temperature along upper horizontal edge is given by $a(x, 20) = x(20 - x)$ when $0 < x < 20$. While the other three edges are kept at 0°C . Find the steady state temperature in the plate. [16]
6. (a) Expand the function $f(x) = -x$ if $-4 \leq x \leq 0$
 $= x$ if $0 \leq x \leq 4$ a Fourier series
 (b) If $f(x) = \pi x$, $0 < x < 1$
 $= \pi(2 - x)$, $1 < x < 2$.
 Find Fourier series in $(0, 2)$ [8+8]
7. (a) Find the Z - transform of 2^{2n+1}
 (b) Find $z^{-1} \left[\frac{z^2}{(z-1)(z-3)} \right]$ [8+8]

Code No: 07A3BS01

R07**Set No. 3**

8. (a) Form the partial differential equation by eliminating the arbitrary functions from
 $Z = f(x + y + z, x^2 + y^2 + z^2)$
- (b) Form the partial differential equation by eliminating the arbitrary functions from $xy + yz + zx = f\left(\frac{z}{x+y}\right)$ [8+8]

FIRSTRANKER