

Code No: R07A1BS06

R07**Set No. 2**

I B.Tech Examinations, December 2010

MATHEMATICAL METHODS

Common to ME, BME, IT, MECT, MEP, AME, ICE, E.COMP.E, ETM,
E.CONT.E, EIE, CSE, ECE, CSSE, EEE

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) If the interval of differencing is unity, prove that $\Delta \frac{2^x}{x!} = \frac{2^x(1-x)}{(x+1)!}$
 (b) If the interval of differencing is unity, prove that $\Delta[x(x+1)(x+2)(x+3)] = 4(x+1)(x+2)(x+3)$. [8+8]
2. (a) Show that the system of equations $x+2y+z=3$, $2x+3y+2z=5$,
 $3x-5y+5z=2$, $3x+9y-z=4$ are consistent and solve them
 (b) Write the following equations in matrix form $AX=B$ and solve for X by finding A^{-1} : $x+y-2z=3$, $2x-y+z=0$, $3x+y-z=8$. [8+8]
3. (a) The table given below reveals the velocity v of a body during the time 't' specified. Find its acceleration at $t=1.1$

t:	1.0	1.1	1.2	1.3	1.4
v:	43.1	47.7	52.1	56.4	60.8

 (b) Fit a curve of the form $y=ax^2+bx+c$ to the data:

x:	1	2	3	4	5
y:	1.8	5.1	8.9	14.1	19.8

 [8+8]
4. Find the eigen values and the corresponding eigen vectors of the matrix

$$A = \begin{bmatrix} 1 & 1 & 1 \\ -1 & -3 & -3 \\ 2 & 4 & 4 \end{bmatrix}$$
 [16]
5. Solve numerically using Euler's method and Taylor's method $y' = (x^3 + xy^2)/e^x$ given that $y(0) = 1$. Find $y(0.1)$, $y(0.2)$ and $y(0.3)$. [16]
6. (a) Solve $(2z - y)p + (x + z)q = -(2x + y)$
 (b) Solve the difference equation, using Z-transform
 $x(k+2) - 5x(k+1) + 6x(k) = 4^n$, given $x(0) = 0$, $x(1) = 1$. [8+8]
7. (a) If 'a' is not an integer, find the Fourier Series expansion of period 2π for the function $f(x) = \sin ax$ in $-\pi < x < \pi$
 (b) Find the half-range Sine series for $f(t) = t - t^2$; $0 < t < 1$. [8+8]
8. Find the rank and index of the quadratic forms and reduce it to canonical form
 $x_1^2 + 2x_2^2 + 6x_3^2 - 2x_1z_1 + 4y_1z_1$ [16]

Code No: R07A1BS06

R07**Set No. 4**

I B.Tech Examinations, December 2010

MATHEMATICAL METHODS

Common to ME, BME, IT, MECT, MEP, AME, ICE, E.COMP.E, ETM,
E.CONT.E, EIE, CSE, ECE, CSSE, EEE

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Solve $(2z - y)p + (x + z)q = -(2x + y)$
(b) Solve the difference equation, using Z-transform
 $x(k+2) - 5x(k+1) + 6x(k) = 4^n$, given $x(0) = 0$, $x(1) = 1$. [8+8]
2. Find the eigen values and the corresponding eigen vectors of the matrix
$$A = \begin{bmatrix} 1 & 1 & 1 \\ -1 & -3 & -3 \\ 2 & 4 & 4 \end{bmatrix}$$
 [16]
3. Solve numerically using Euler's method and Taylor's method $y' = (x^3 + xy^2)/e^x$ given that $y(0) = 1$. Find $y(0.1)$, $y(0.2)$ and $y(0.3)$. [16]
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5. (a) The table given below reveals the velocity v of a body during the time 't' specified. Find its acceleration at $t = 1.1$

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v:	43.1	47.7	52.1	56.4	60.8

(b) Fit a curve of the form $y = ax^2 + bx + c$ to the data:

x:	1	2	3	4	5
y:	1.8	5.1	8.9	14.1	19.8

 [8+8]
6. (a) Show that the system of equations $x + 2y + z = 3$, $2x + 3y + 2z = 5$,
 $3x - 5y + 5z = 2$, $3x + 9y - z = 4$ are consistent and solve them
(b) Write the following equations in matrix form $AX = B$ and solve for X by finding A^{-1} : $x + y - 2z = 3$, $2x - y + z = 0$, $3x + y - z = 8$. [8+8]
7. (a) If the interval of differencing is unity, prove that $\Delta \frac{2^x}{x!} = \frac{2^x(1-x)}{(x+1)!}$
(b) If the interval of differencing is unity, prove that $\Delta[x(x+1)(x+2)(x+3)] = 4(x+1)(x+2)(x+3)$. [8+8]
8. Find the rank and index of the quadratic forms and reduce it to canonical form
 $x_1^2 + 2x_2^2 + 6x_3^2 - 2x_1z_1 + 4y_1z_1$ [16]

Code No: R07A1BS06

R07**Set No. 1**

I B.Tech Examinations, December 2010

MATHEMATICAL METHODS

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E.CONT.E, EIE, CSE, ECE, CSSE, EEE

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) If 'a' is not an integer, find the Fourier Series expansion of period 2π for the function $f(x) = \sin ax$ in $-\pi < x < \pi$
- (b) Find the half-range Sine series for $f(t) = t - t^2$; $0 < t < 1$. [8+8]
2. (a) Show that the system of equations $x + 2y + z = 3$, $2x + 3y + 2z = 5$,
 $3x - 5y + 5z = 2$, $3x + 9y - z = 4$ are consistent and solve them
- (b) Write the following equations in matrix form $AX = B$ and solve for X by finding A^{-1} : $x + y - 2z = 3$, $2x - y + z = 0$, $3x + y - z = 8$. [8+8]
3. (a) Solve $(2z - y)p + (x + z)q = -(2x + y)$
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 $x(k+2) - 5x(k+1) + 6x(k) = 4^n$, given $x(0) = 0$, $x(1) = 1$. [8+8]
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 [8+8]
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8. Solve numerically using Euler's method and Taylor's method $y' = (x^3 + xy^2)/e^x$ given that $y(0) = 1$. Find $y(0.1)$, $y(0.2)$ and $y(0.3)$. [16]

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R07**Set No. 3**

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E.CONT.E, EIE, CSE, ECE, CSSE, EEE

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) The table given below reveals the velocity v of a body during the time 't' specified. Find its acceleration at $t=1.1$
- | | | | | | |
|----|------|------|------|------|------|
| t: | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 |
| v: | 43.1 | 47.7 | 52.1 | 56.4 | 60.8 |
- (b) Fit a curve of the form $y=ax^2+bx+c$ to the data:
- | | | | | | |
|----|-----|-----|-----|------|------|
| x: | 1 | 2 | 3 | 4 | 5 |
| y: | 1.8 | 5.1 | 8.9 | 14.1 | 19.8 |
- [8+8]
2. (a) Show that the system of equations $x + 2y + z = 3$, $2x + 3y + 2z = 5$, $3x - 5y + 5z = 2$, $3x + 9y - z = 4$ are consistent and solve them
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