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

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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 Δ[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)= sinax 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]

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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

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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]

4. (a) If 'a' is not an integer, find the Fourier Series expansion of period 2π for the function f(x)= sinax in $-\pi <$ x $< \pi$
   (b) Find the half-range Sine series for f(t) = t - t^2 ; 0 < t < 1. [8+8]

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

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]

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
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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 Δ[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]

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Code No: R07A1BS06 **R07** **Set No. 1**

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) If 'a' is not an integer, find the Fourier Series expansion of period 2π for the function f(x)= sinax 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 $(2z - y)p + (x + z)q = -(2x + y)$
   (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]

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[8+8]

5. 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]

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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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Code No: R07A1BS06 **R07** **Set No. 3**

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

Answer any FIVE Questions
All Questions carry equal marks

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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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3. (a) If 'a' is not an integer, find the Fourier Series expansion of period 2π for the function f(x)= sinax in $-\pi < x < \pi$

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$$A = \begin{bmatrix} 1 & 1 & 1 \\ -1 & -3 & -3 \\ 2 & 4 & 4 \end{bmatrix}$$ [16]

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   ${x_1}^2+2{x_2}^2+6{x_3}^2 - 2x_1z_1+4y_1z_1$ [16]

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