G,H,I,J,K,L

USN | | | | | | | | | | |

H

NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belgaum)

II Sem B.E. (Credit System) Mid Semester Examinations – I March 2013

Duration: 1 Hour

12MA201 – ENGINEERING MATHEMATICS - II

Max. Marks: 20

*Note: Answer **Five full** questions choosing at least **two** from **each Part.***

Part – I

1. Solve $(x^2+y^2)dx = xydy$.

2. Solve $\left(xy^2 - e^{\frac{1}{x^3}}\right)dx - x^2ydy = 0$.

3. Solve the differential equation $\frac{dy}{dx} + x\sin 2y = x^3\cos^2 y$.

4. Find the orthogonal trajectory of the family of curves $r^2 = a^2\cos 2\theta$.

Part – II

5. Define (i) linear dependence (ii) linear independence of a set of vectors $\{u_1, u_2, \ldots, u_n\}$

Check whether the set {(1, 4, 5); (4, 4, 8); (3, -3, 0)} is linearly dependent.

6. Define the rank of a matrix. Find the rank of the matrix

$$\begin{bmatrix} 2 & -1 & -3 & -1 \\ 1 & 3 & 3 & -1 \\ 0 & 1 & 1 & -1 \\ 1 & 0 & 1 & 1 \end{bmatrix}$$

by reducing to row echelon form.

7. Using Gauss-Seidel iteration method solve the system of equations:

$20x + y - 2z = 17$

$3x + 20y - z = -18$

$2x - 3y + 20z = 25$

Start with $X^{(0)} = y^{(0)} = z^{(0)} = 0$ and carryout 3 iterations.

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B,C,D,E,F

USN | | | | | | | | | | |

3

NMAM INSTITUTE OF TECHNOLOGY, NITTE

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II Sem B.E. (Credit System) Mid Semester Examinations – I March 2013

ration: 1 Hour

12MA201 – ENGINEERING MATHEMATICS - II

Max. Marks: 20

*Note: Answer **Five** questions choosing **at least Two** from **each Part.***

Part – I

Solve the differential equation $\frac{dy}{dx} = \frac{x+y-1}{x+y+1}$.

Solve the differential equation $y(x+y+1)dx + x(x+3y+2)dy = 0$.

Solve the differential equation $\tan y \frac{dy}{dx} + \tan x = \cos y \cos^2 x$.

Find the orthogonal trajectory of the family of curves $r^n = a^n \sin n\theta$.

Part – II

Define a basis for a vector space. Check whether the set $\{(1,0,7);(1,2,4);(1,0,3)\}$ is a basis for R^3.

Define rank of a matrix. Find the rank of the matrix

$$\begin{bmatrix} 1 & 1 & 1 & 4 \\ 2 & 1 & -1 & 1 \\ 1 & -1 & 2 & 2 \\ 2 & 0 & 3 & 6 \end{bmatrix}$$

by reducing it to row echelon form.

Use Gauss Seidel iteration method to solve

$5x - 2y + z = 3$

$x + 4y - 2z = 5$ start with $x^{(0)} = y^{(0)} = z^{(0)} = 0$ and carry out three iterations.

$4x + y + 6z = -8$

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Sections: G,H,I,J,K,L

C

USN | | | | | | | | | | |

2

NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belgaum)

II Sem B.E. (Credit System) Mid Semester Examinations – II, April 2013

12MA201 – ENGINEERING MATHEMATICS - II

Duration: 1 Hour

Max. Marks: 20

*Note: Answer **Five** full questions choosing **at least two** from **each Part.***

Part – I

1. Solve the differential equation $(4D^2 - 1)y = e^{\frac{x}{2}} + 12e^x + 4$.
2. Solve the differential equation $(D^2 - 4D + 3)y = \sin 3x$.
3. Using the method of variation of parameters, solve $(D^2 + 1)y = \sec x \tan x$.
4. Solve the differential equation $x^2 \frac{d^2y}{dx^2} + 2x\frac{dy}{dx} - 12y = x^3$.

Part – II

5. Evaluate $\iint_D xy(x+y)dxdy$ if D is the region bounded by $y=x^2$ and $y=x$.
6. By changing the order of integration evaluate $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y} dy\,dx$
7. Find the largest eigen value and the corresponding eigen vector of the matrix $\begin{bmatrix} 25 & 1 & 2 \\ 1 & 3 & 0 \\ 2 & 0 & -4 \end{bmatrix}$ by using power method. Start with the initial vector $\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ and carry out five iterations.

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ections: A,B,C,D,E & F

USN

NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belgaum)

II Sem B.E. (Credit System) Mid Semester Examinations – II, April 2013

12MA201 – ENGINEERING MATHEMATICS - II

uration: 1 Hour

Max. Marks: 20

*Note: Answer **Five** questions choosing **at least two** from **each Part.***

Part – I

Solve the differential equation $(D^2-4D+4)y=e^{2x}$.

Using the method of variation of parameters solve the differential equation $(D^2-2D+1)y=\frac{e^x}{x}$.

Solve the differential equation $(D^2+2D+2)y=1+3x+x^2$.

Solve the differential equation $x^2\frac{d^2y}{dx^2}-2x\frac{dy}{dx}-4y=x^2+2\log x$.

Part – II

Evaluate $\iint_D (x^2+y^2)dxdy$ if D is the region bounded between $x=2, y=1$ and $y=x^2$.

Evaluate $\int_0^\infty\int_0^\infty e^{-(x^2+y^2)}\,dxdy$ by changing to polar coordinates .

Using Power method find the largest eigen value and the corresponding eigen vector of the matrix $\begin{bmatrix}2&-1&0\\-1&2&-1\\0&-1&2\end{bmatrix}$. Take the initial eigen vector as $\begin{bmatrix}1\\0\\0\end{bmatrix}$ and carry out five iterations.

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