

MANIPAL INSTITUTE OF TECHNOLOGY MANIPAL

A Constituent Institution of Manipal University

## FIRST SEMESTER B.TECH. (COMMON TO ALL BRANCHES) END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: ENGINEERING MATHEMATICS-I [MAT 1101]

## REVISED CREDIT SYSTEM (24/11/2016)

Time: 3 Hours

MAX. MARKS: 50

## Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitably assumed.

1A.	Use Newton Raphson method to find a real root of $xsinx + cosx = 0$ near $x = \pi$ . Carry out three iterations up to four decimal places of accuracy.							
1 <b>B.</b>	Solve $(4xy + 3y^2 - x)dx + (x^2 + 2xy)dy = 0.$							
1C.	Solve $\frac{dx}{dt} + 5x - 2y = t$ , $\frac{dy}{dt} + 2x + y = 0$ given that $x = y = 0$ when $t = 0$ .							
2A.	From the following data estimate the number of students who have got marks more than 40 but less than 45.Marks30-4040-5050-6060-7070-80Number of students3142513531							
2B.	Given the set of tabulated points $(-1,3)$ , $(0,-6)$ , $(3,39)$ , $(6,822)$ and $(7,1611)$ satisfying the function $y = f(x)$ , compute $f(4)$ using Newton's divided difference formula.							
2C.	Solve the following equations by Gauss elimination method: 5x + y + z + w = 4 $x + 7y + z + w = 12$ $x + y + 6z + w = -5$ $x + y + z + 4w = -6$							

MAT 1101

Reg.	No.



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3A.	From the form $\frac{x}{y}$	llowing t 1.0 0	able find $ \frac{1.2}{0.128} $	f '(2.0) an <u>1.4</u> 0.544	nd f "(1.0) <u> 1.6</u> 1.296	). 1.8 2.432	2.0 4.00	<b>3M</b>		
3B.	Find all the eigen values and any one eigen vector of $\begin{bmatrix} 7 & -2 & 0 \\ -2 & 6 & -2 \\ 0 & -2 & 5 \end{bmatrix}$ .									
3C.	Solve $(D^2 + 4)y = x^2 + \cos 2x + 2^{-x}$ .									
<b>4</b> A.	Using Gram-Schmidt process construct an orthonormal set of the basis vectors from the given set of vectors $(0,1,1),(1,0,1),(1,1,1)$ .									
4 <b>B</b> .	Use Simpson's $(3/8)^{\text{th}}$ rule to evaluate $\int_0^1 e^{-x^2} dx$ by taking seven ordinates.									
4C.	Using modified Euler's method, find $y(0.2)$ and $y(0.4)$ given $y' = y + e^x$ , $y(0) = 0$ with $h = 0.2$ .									
5A.	Solve: $(1+x)^2 \frac{d^2 y}{dx^2} + (1+x) \frac{dy}{dx} + y = 2\sin[\log(1+x)].$									
5B.	Solve the following system by Gauss-Seidel iteration method $3x + 20y - z = -18, 20x + y - 2z = 17, 2x - 3y + 20z = 25$ . Carry out five iterations correct to four decimal places.									
5C.	Prove that any set of n linearly independent vectors of vector space $E^n$ forms a basis of $E^n$ .									