

Code.No: R05012101

R05

SET-1

I - B.TECH EXAMINATIONS, DECEMBER - 2010
NUMERICAL METHODS
(AERONAUTICAL ENGINEERING)

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

Answer any FIVE questions
All questions carry equal marks

- - -

- 1.a) Explain about Iteration method.
 b) Find the root of the equation $2x = \cos x + 3$ correct to three decimal places.
 c) Find a root of the equation $x \sin x + \cos x = 0$. By Newton - Rapson method. [16]
- 2.a) Find the cubic polynomial which takes the following values. $y(1) = 24$, $y(3) = 120$, $y(5) = 336$ and $y(7) = 720$. Hence, obtain the value of $y(8)$.
 b) From the following table, find the value of $e^{1.17}$ using Gauss forward formula. [16]

x	1.00	1.05	1.10	1.15	1.20	1.25	1.30
e^x	2.7183	2.8577	3.0042	3.1582	3.3201	3.4903	3.6693

- 3.a) An experiment on life time 't' of cutting tool at different cutting speeds 'S' are given below:

Speed S	350	400	500	600
Life t	61	26	7	2.6

Fit a relation of the form $S = \alpha t^b$.

- b) Fit the curve $y = ax^2 + bx + c$ to the data:

x	0	1	2	3	4
y	1	1.8	1.3	2.5	2.3

And find 'y' when $x = 5$.

[16]

4. We consider Knots 0, 1, 2, 3, 4, 5, 6 and compute B-splines of order 6 (degree 5) at $x = 1$ and $x = 2$. [16]

- 5.a) The distances traveled by a rocket at different times are as given below:

τ	0	1	2	3	4	5
s	0	3	7	15	38	50

Estimate the rocket's velocity and acceleration for each value of ' τ '.

- b) Find the value of $\int_0^1 \frac{1}{1+x} dx$ by Simpson's $\frac{3}{8}$ rule with $h = \frac{1}{6}$. [16]

Code.No: R05012101

R05

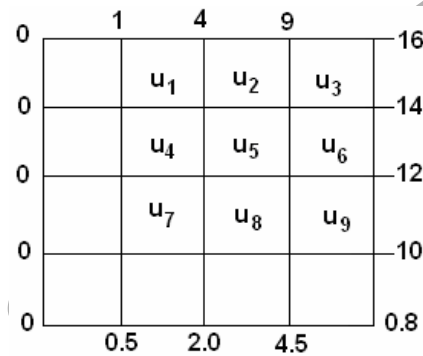
SET-1

6.a) Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & -1 \\ 3 & 4 & 4 & -2 \\ 7 & 10 & 12 & 3 \\ 2 & -1 & 3 & -2 \end{bmatrix}$

b) Solve $2x + 3y + z = 9$; $x + 2y + 3z = 6$; $3x + y + 2z = 8$. By LU-Decomposition method. [16]

7. Using Milne's Predictor-corrector method determine $y(0.3)$, given that $y' = x^2 + y^2 - 2$, $y(0) = 1$. [16]

8. Solve Laplace equation $\nabla^2 u = 0$ at interior points of the square. [16]



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SET-2

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Speed $\mathcal{G}$	350	400	500	600
Life t	61	26	7	2.6

Fit a relation of the form $\mathcal{G} = \alpha t^b$.

- b) Fit the curve $y = ax^2 + bx + c$ to the data:

x	0	1	2	3	4
y	1	1.8	1.3	2.5	2.3

And find 'y' when $\alpha = 5$.

[16]

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[16]

- 4.a) Find the rank of the matrix
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[16]

5. Using Milne's Predictor-corrector method determine $y(0.3)$, given that $y^1 = x^2 + y^2 - 2$, $y(0) = 1$.

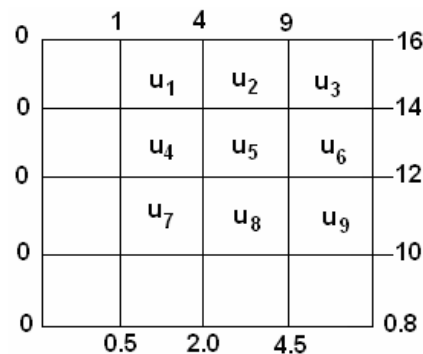
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Code.No: R05012101

R05

SET-2

6. Solve Laplace equation $\nabla^2 u = 0$ at interior points of the square. [16]



- 7.a) Explain about Iteration method.
 b) Find the root of the equation $2x = \cos x + 3$ correct to three decimal places.
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3. Using Milne's Predictor-corrector method determine $y(0.3)$, given that $y' = x^2 + y^2 - 2$, $y(0) = 1$. [16]

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	1	4	9	
0		u_1	u_2	u_3
0		u_4	u_5	u_6
0		u_7	u_8	u_9
0				
0				
0				
	0.5	2.0	4.5	

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SET-4

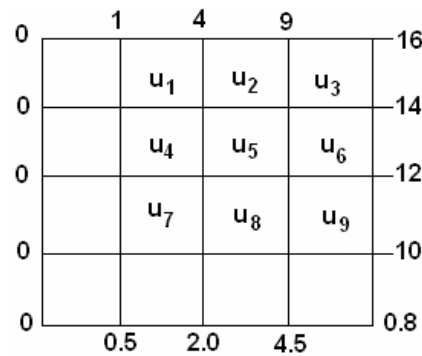
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Fit a relation of the form $G = \alpha t^b$.

Code.No: R05012101

R05

SET-4

- b) Fit the curve $y = ax^2 + bx + c$ to the data:

x	0	1	2	3	4
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And find 'y' when $x = 5$.

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