b) State D'Alembert's ratio test. Test for the convergence of the series $(\frac{1}{3})^2+(\frac{1.2}{3.5})^2+(\frac{1.2.3}{3.5.7})^2+\ldots\ldots\ldots\infty$. 5 L1

4. a) Test for the convergence of the series $1+\frac{1}{2^2}+\frac{2^2}{3^3}+\frac{3^3}{4^4}+\ldots\ldots\ldots\infty$. 5 L2

b) State Cauchy's root test. Test for the convergence of the series $\sum(1-\frac{3}{n})^{n^2}$. 5 L1

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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:tions: J- T)

USN

NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belagavi)

I Sem B.E. (Credit System) Mid Semester Examinations - I, February 2022

21MA101 – ENGINEERING MATHEMATICS - I

ation: 1 Hour

Max. Marks: 20

*Note: Answer any **One** full question from **each Unit.***

Unit – I

		Marks	BT*	CO*	PO*
a)	Find the eigen values and corresponding eigen vectors of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 1 & 2 & 0 \\ 2 & 2 & 3 \end{bmatrix}$.	6	L*2	1	2
b)	Define rank of a matrix. Also find the rank of the following matrix by elementary row transformation. $\begin{bmatrix} 1 & 3 & 4 & -2 \\ 3 & -1 & 2 & 0 \\ 2 & 1 & 3 & -1 \\ 4 & -3 & 1 & 1 \end{bmatrix}$	4	L1	1	1
a)	Test for consistency and hence solve the following system of equations by Gauss elimination method. $x-3y+2z=1$, $3x+y+z=2$, $7x-y+4z=5$	5	L2	1	2
b)	Solve the following system of equations by Gauss- Seidel iteration method. $27x+6y-z=85$, $6x+15y+2z=72$, $x+y+54z=110$. Start with $x^{(0)}=y^{(0)}=z^{(0)}=0$ and carry out three iterations.	5	L1	1	1

Unit – II

a)	Using the Rayleigh's power method find the largest eigen value and the corresponding eigen vector of the matrix $\begin{bmatrix} 4 & 1 & -1 \\ 2 & 3 & -1 \\ -2 & 1 & 5 \end{bmatrix}$. Take the initial approximation to the eigen vector as $[1\ 0.8\ 0.8]^T$ and carry out 4 iterations.	5	L2	1	2

P.T.O.