

21MA101

b) State D'Alembert's ratio test. Test for the convergence of the series

$$\left(\frac{1}{3}\right)^2 + \left(\frac{1.2}{3.5}\right)^2 + \left(\frac{1.2.3}{3.5.7}\right)^2 + \dots \infty.$$

4. a) Test for the convergence of the series

$$1 + \frac{1}{2^2} + \frac{2^2}{3^3} + \frac{3^3}{4^4} + \dots \infty.$$

b) State Cauchy's root test. Test for the convergence of the series

$$\sum \left(1 - \frac{3}{n}\right)^{n^2}.$$

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

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. $\begin{aligned} x-3y+2z &= 1 \\ 3x+y+z &= 2 \\ 7x-y+4z &= 5 \end{aligned}$	5	L2	1	2
b)	Solve the following system of equations by Gauss-Seidel iteration method. $\begin{aligned} 27x+6y-z &= 85 \\ 6x+15y+2z &= 72 \\ x+y+54z &= 110 \end{aligned}$	5	L1	1	1
Start with $x^{(0)} = y^{(0)} = z^{(0)} = 0$ and carry out three iterations.					

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.

P.T.O.