Reg. No. : | | | | | | | | | | |

Question Paper Code: 92008

B.E./B.Tech. DEGREE EXAMINATION, AUGUST 2021

Second Semester

19UMA208- Linear algebra and numerical techniques

Computer Science and Business System

(Regulation 2019)

Duration: 1.45 hrs Maximum: 50 Marks

PART A (Answer Any Ten) 10*2 = 20 Marks

1. The Product of two Eigen values of $\begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix}$ is 16 .Find the third Eigen value. CO6- AP

2. Construct the matrix of the quadratic forms $2x_1x_2 + 2x_2x_3 - 2x_3x_1$ CO1- AP

3. Explain the Cayley Hamilton theorem. CO1- AP

4. ApplyGauss –Jordan methodsolve the linear system $x + y = 2; 2x + 3y = 5$. CO2- AP

5. Explaintriangularization method. CO2- AP

6. Apply Gauss-Jordan method calculate the inverse of $A = \begin{pmatrix} 1 & 3 \\ 2 & 7 \end{pmatrix}$ CO2- AP

7. Explain Newton's backward interpolation formula CO3- AP

8. Apply divided difference method Calculate the second divided difference with arguments a,b. If $f(x) = \frac{1}{x}$. CO3- U

9 Explain the order of convergence and convergence condition for newton's Raphson method CO3- AP

10 Explain rank-nullity theorem CO6- AP

11 Find the matrix of $T : V_2(R) \to V_3(R)$ given by $T(a,b) = (a + 3b, 0, 2a - 4b)$ for the standard Basis of $V_2(R)$ CO4- AP

12	Define the two properties of Linear transformation	CO6- AP	
13	Compare orthogonal set and orthonormal set?	CO5- U	
14	If $x=(2,1+i,i)$ and $y=(2-i,2,1+2i)$ .Find $\langle x,y\rangle$	CO5- AP	
15	Explain inner product space	CO5- AP	

PART B (Answer Any Three) 3*10 = 30 Marks

16.	Apply the orthogonal transformation reduce the following quadratic forms into canonical form $Q=6x^2+3y^2+3z^2-4xy-2yz+4zx$, find its rank, index, signature and nature	CO1App	(10)
17	Apply Gauss Jordan method to solve 10x+y+z=12, 2x+10y+z=13, x+y+5z=7	CO2-App	(10)
18	Apply Newton Raphson Method Calculate a root of $x\log_{10}x-1.2=0$ correct to 3 decimals.	CO3- App	(10)
19	Construct the liner transformation $T:V_3(R)\to V_3(R)$ determine by the matrix $\begin{pmatrix}1 & 2 & 1\\ 0 & 1 & 1\\ -1 & 3 & 4\end{pmatrix}$ with respect the standard basis of $V_3(R)$	CO4- App	(10)
20	Apply Gram-Schmidth process to construct an orthonormal basis for $V_3(R)$ with standard inner product for the basis $\{V_1,V_2,V_3\}$ where $V_1=(1,0,1),V_2=(1,0,-1)$ $and V_3=(0,3,4)$.	CO5- App	(10)