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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute)
Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow
B.Tech
FIRST YEAR (SEMESTER-II) THEORY EXAMINATION   (2020-2021)
(Subjective Type)

Subject Code: ACSBS0205   Max. Mks. : 30

Subject: Linear Algebra   Time   : 50 Minutes

<u>General Instructions:</u>

All questions are compulsory.

Question No. 1 to 15 are subjective type question carrying 3 marks each. Attempt any 10 out of 15 questions.

Q.No	Question Content	Question Image	Category	Sub Category	Marks	Options Randomization	Type	Difficulty
1		If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ show that $A^2 - 5A = 2I$, where I is the unit matrix of order 2.	Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
2		If $A = \begin{bmatrix} x+y & 2x+z \\ x-y & 2z+w \end{bmatrix} = \begin{bmatrix} 4 & 7 \\ 0 & 10 \end{bmatrix}$, then find the value of x, y, z and w.	Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
3		Find the inverse of a matrix $A = \begin{bmatrix} 1 & 3 \\ 5 & 6 \end{bmatrix}$ using inverse formula.	Attempt any 10 Questions	10 X 3= 30	3		Subjective	Smart
4	Find the value of λ for which the vectors X =(1, -2, λ), Y=(2, -1, 5) and Z=(3, -5, 7) are linearly dependent.		Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
5		Find the values of P for which the matrix A = $\begin{bmatrix} 3 & P & P \\ P & 3 & P \\ P & P & 3 \end{bmatrix}$ is of rank 1.	Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
6	Explain LU decomposition method.		Attempt any 10 Questions	10 X 3= 30	3		Subjective	Smart
7	Check the vectors (1, -2, 1), (2, 1, -1), (7, -4, 1) in R3 are linearly independent or linearly dependent		Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
8	Explain QR decomposition method.		Attempt any 10 Questions	10 X 3= 30	3		Subjective	Smart

Q.No	Question Content	Question Image	Category	Sub Category	Marks	Options Randomization	Type	Difficulty
9	Show that the set W of the elements of the vector space V3 (R) of the form (, 2 , 3z) where x, y and z are real numbers, is a subspace of V3 (R). x y		Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
10		Obtain the Eigen value of $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$.	Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
11		Show that the mapping $T : V_3(R) \to V_2(R)$ defined as $T(a_1, a_2, a_3) = (a_1 - a_2, a_1 - a_3)$ is a linear transformation.	Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
12		Show that the matrix $A = \begin{bmatrix} 2 & 3 - 4i \\ 3 + 4i & 2 \end{bmatrix}$ is a Hermitian matrix.	Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
13	Explain principal component analysis.		Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
14		In singular value decomposition if $A = \begin{bmatrix} 2 & 2 \\ 1 & 1 \end{bmatrix}$ find S. .	Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant
15		In singular value decomposition if $A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 3 & 1 \end{bmatrix}$ find U.	Attempt any 10 Questions	10 X 3= 30	3		Subjective	Brilliant