Name: Dishti Sahani 35 Student University Roll No.:	Printed Pages:
School of Engineering First Sessional Examination, Odd Semester (AS: 2022-23) B. Tech: ALL Branch Year: 1 Semester: 1	
Course Title: Matrices and Calculus Course Code: BAS3101	M.M.: 30 Time: 1 *hr*

SET B

Instructions if any: Read the question Carefully.

	SECTION 'A' **Q.N.1. Attempt all parts of the following:**	Course Objective	Marks
a)	Define Hermitians and skew Hermitians matrix.	CO1	1
b)	Find the Eigen values of matrix $A=\begin{bmatrix} 2 & \sqrt{2} \\ \sqrt{2} & 2 \end{bmatrix}$	CO1	1
c)	Define Involuntary matrix.	CO1	1
d)	Write statement Cayley's Hamilton theorem.	CO1	1
e)	For what value of k the rank of $A=\begin{bmatrix} 1 & 7 \\ -3 & k \end{bmatrix}$ is 1	CO1	1
	SECTION 'B' **Q.N.2. Attempt any two parts of the following:**	Course Objective	Marks
a)	For what value of λ and μ the equation x+y+z=6 x+2y+3z=10 x+2y+λz=μ Have (i) no solution (ii) a unique solution (iii) an infinite number of solution.	CO1	7.5
b)	Examine the vector $X_1=(1,-1,1)$, $X_2=(2,1,1)$, $X_3=(3,0,2)$ for linear dependence. If dependent, find the relation between them.	CO1	
c)	Reduce the matrix to Echelon form and then find its rank. $A=\begin{bmatrix} 2 & 3 & 4 & -1 \\ 5 & 2 & 0 & -1 \\ -4 & 5 & 12 & -1 \end{bmatrix}$	CO1	
d)	Define orthogonal matrix. Show that $A=\frac{1}{3}\begin{bmatrix} -2 & 1 & 2 \\ 2 & 2 & 1 \\ 1 & -2 & 2 \end{bmatrix}$ is orthogonal.	CO1	
	SECTION 'C' **Q.N.3. Attempt any one part of the following**	Course Objectiv	
a)	Find the Eigen vector of matrix $A=\begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$	CO1	
b)	Find the rank of the matrix by reducing it to normal form $A=\begin{bmatrix} 1 & 2 & -1 & 4 \\ 2 & 4 & 3 & 4 \\ 1 & 2 & 3 & 4 \\ -1 & -2 & 6 & -7 \end{bmatrix}$	CO1	
c)	Find the characteristic equation of the matrix $A=\begin{bmatrix} 4 & 3 & 1 \\ 2 & 1 & -2 \\ 1 & 2 & 1 \end{bmatrix}$ Hence find A^{-1}	CO1	