Sir Syed University of Engineering & Technology

ANSWER SCRIPT

Date:	28 December 2020
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Section:	A
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Course Name:	Linear Algebra
Degree Program:	Software Engineering
Total number of pages being submitted:	2

Assignment # 03

a. 0
b. 2
c. 2

Q $A = \begin{bmatrix} -1 & 5 & 2 \\ 0 & -2 & 0 \\ 0 & -3 & a \end{bmatrix}$

Sol

$A = \begin{bmatrix} -1 & 5 & 2 \\ 0 & -2 & 0 \\ 0 & -3 & 0 \end{bmatrix}$

$Ax = \lambda x \longrightarrow (1)$

$x = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$

putting in eq (1).

$\Rightarrow \begin{bmatrix} -1 & 5 & 2 \\ 0 & -2 & 0 \\ 0 & -3 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \lambda \begin{bmatrix} x \\ y \\ z \end{bmatrix}$

characteristic determinant.

$$= A - \lambda I = 0$$

$$= \begin{bmatrix} -1-\lambda & 5 & 2 \\ 0 & -2-\lambda & 0 \\ 0 & -3 & 0-\lambda \end{bmatrix}$$

Expanding by C_1

$$\Rightarrow (-1-\lambda) \begin{vmatrix} -2-\lambda & 0 \\ -3 & 0-\lambda \end{vmatrix} - 0 + 0 = 0$$

characteristic equation.

$$\Rightarrow (-1-\lambda)\{(-2-\lambda)(-\lambda) - 0\} = 0$$

$$= (-1-\lambda)\{(-2-\lambda)(-\lambda) = 0$$

$$= -1-\lambda = 0 \quad , -2-\lambda = 0 \quad , \quad -\lambda = 0$$

$$\lambda = -1 \quad , \quad \lambda = -2 \quad , \quad \lambda = 0$$

Values of λ is $\lambda_1 = -1$, $\lambda_2 = -2$, $\lambda_3 = 0$