VICTORIA UNIVERSITY Of BANGLADESH

Assignment On

Course Name: Linear Algebra
Course Code : MAT-215

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Ans. to the Q. No - ~~4~~ 2

~~4 Given A ∈ M_{22} we have that~~

(2) it is Given in the question that the null space of A is a line, thus it can be interpreted that it is 1- dimensonal subspace.

Consider the rank - nullity theorem;

$\rho(A) + \text{nullity}(A) = \dim(A)$

Here, $\rho(A)$ is the rank of A.

putting the values in the above equation.

$\rho(A)+1=3$

$\rho(A)=2$

Hence it can said that it is the dimension of its row or column space. Those it can be said that column space cannot be a line, but it will ba a plane.

Ans. to. the Q. NO - 3

3

* Relating the Determinant to the characteristic polynomial. the key to this problem lies in understanding the relationship between the determinant of a matrix and its characteristic polynomial.

we know that. $P(\lambda) = \det(A - \lambda I)$. if we evaluate $P(0)$, we get:

$P(0) = \det(A - 0I) = \det(A)$

* Evaluating the characteristic polynomial, we are given $P(\lambda) = \lambda^3 - 2\lambda^3 + \lambda + 5$. To find the determinant of A, we simply need to evaluate $P(0)$:

$P(0) = (0)^3 - 2(0^3) + (0) + 5 = 5.$

Therefore, the determinant of matrix A, denoted as det (A), is ∴ 5.

Ans.to. the. Q.NO-1

* The Rank-Nullity Theorem:

The Rank. nullity theorem states that for any matrix A, The rank of A (the dimension of the column space) equals the number or columns of A.

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In summary

matrix size	max Rank	min nullity
4x4	4	0
3x5	3	2
5x3	3	0