

FINAL PAPER EXAMINATION

Department of computer science, BZU. Multan

Total marks: 50

Time: 120 minutes

Attempt all the give questions.

QNO1: For given matrix, find all eigenvalues and a basis for eigenspace. Show that the matrix is diagonalizable.

$$\begin{pmatrix} 0 & 0 & 2 \\ 0 & -2 & 0 \\ 0 & 0 & -6 \end{pmatrix}, \begin{pmatrix} 2 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 2 \end{pmatrix}$$

QNO2: (a) For given matrix find inverse if exist

$$\begin{pmatrix} 1 & 1 & 1 \\ 3 & 5 & 4 \\ 3 & 6 & 7 \end{pmatrix}$$

(b) Find a basis for the span of $\{(2, 1, 2), (-3, 5, 7), (-6, -3, -6)\}$ in \mathbb{R}^3

QNO3: Consider the subset S of all matrices in $M_{\mathbb{R}}$ which have eigenvalue 1. Is S is a subspace of $M_{\mathbb{R}}$. Explain why or why not

QNO4: Suppose A is $m \times m$ invertible matrix with n real eigenvalues d_1, d_2, \dots, d_r . If $B = A^{-1}$ what are the real eigenvalues of B . Justify your answer

QNO5: Determine whether the given vectors are linearly independent or linearly dependent in \mathbb{R}^3

$$(-2, 0, 4), (3, 4, 5), (6, -1, 2), (7, 0, -4)$$