ID #:____________ **Name:_____________** **Quiz 6 (MATH 202)** **Serial:______**

Q1. Find all eigenvalue of $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$

Q2. If the eigenvalues of $A = \begin{bmatrix} 2 & 8 \\ -1 & -2 \end{bmatrix}$ are $\lambda = \pm i,$ find the general solution of the system $X' = AX$.

Q.3. $\Phi = \begin{bmatrix} 1 & 3e^{2t} \\ 1 & 2e^{2t} \end{bmatrix}$ is a Fundamental Matrix of the system $X' = AX + \begin{bmatrix} 3 \\ -1 \end{bmatrix}$.

(i) Indentify the eigenvalues and corresponding eignevectors of A.

(ii) Find the Particular Solution of the system.

Q.4. Find the solution of the IVP: $X' = AX + F,\ X(0) = \begin{bmatrix} 5 \\ 3 \end{bmatrix}$ if $X = c_1 \begin{bmatrix} 1 \\ 1 \end{bmatrix} + c_2 \begin{bmatrix} 2 \\ 1 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix}$.

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Q.1. The system $\begin{array}{l} \frac{dx}{dt} = 3x - y - z \\ \frac{dy}{dt} = x + y - z \\ \frac{dz}{dt} = x - y + z \end{array}$ has eigenvalues $\lambda = 1, 2, 2$ where $K_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ is an eigenvector corresponding to $\lambda = 1$. Find the general solution of the the system.

Q.2. $X = \begin{bmatrix} -1 & 3 \\ -3 & 5 \end{bmatrix}$ has eigenvalues $\lambda = 2, 2$, find the general solution of the system $X' = AX$.

Q.3. $\Phi = \begin{bmatrix} 1 & 3e^{2t} \\ 1 & 2e^{2t} \end{bmatrix}$ is a Fundamental Matrix of the system $X' = AX + \begin{bmatrix} 3 \\ -1 \end{bmatrix}$.

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