King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 202 Section 07 Quiz III (Term 132)

Name : ..... **ID** #..... Serial #: .....

1. Solve

a) $X' = \begin{pmatrix} 5 & -4 & 0 \\ 1 & 0 & 2 \\ 0 & 2 & 5 \end{pmatrix} X$

b) $\dfrac{dx}{dt} = 4x + 5y$

$\dfrac{dy}{dt} = -2x + 6y$

c) $\dfrac{dx}{dt} = x + y - z$

$\dfrac{dy}{dt} = 2y$

$\dfrac{dz}{dt} = y - z$

subject to $x(0) = 1;\ y(0) = 0;\ z(0) = 0$

2. Given that $X_1 = \begin{pmatrix} 2 \\ 1 \end{pmatrix} e^t$ and $X_2 = \begin{pmatrix} 1 \\ 1 \end{pmatrix} e^{2t}$ form a fundamental set for $X' = AX$. Find the general solution of $X' = AX + \begin{pmatrix} 1 \\ -1 \end{pmatrix} e^t$.