KFUPM **Semester 142**

Dept. Math. & Stat. **A.Y:2014/2015**

Test 5 **Tuesday (May 12, 2015)**

Name: …… **ID: ……**

Exercise 1: Find a particular solution of

$$X' = A(t)X + \begin{bmatrix}1\\1\end{bmatrix},$$

given that

$$M(t) = \begin{bmatrix}2 & 2e^{-2t}\\ 2e^{2t} & 4\end{bmatrix}$$

is a fundamental matrix for the complementary system.

Exercise 2:

(a) Find a particular solution of

$$\boldsymbol{X'(t) = \begin{bmatrix} 2 & -1 & -1 \\ 1 & 0 & -1 \\ 1 & -1 & 0 \end{bmatrix} X(t) + \begin{bmatrix} e^t \\ 0 \\ e^{-t} \end{bmatrix}}.$$

(b) Find the general solution of the previous differential system

Exercise 3: Find e^{tA}, for $A = \begin{bmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$ and solve the differential system $X' = AX$.