KFUPM, DEPARTMENT OF MATHEMATICS AND STATISTICS

MATH 202 : TEST 5, SEMESTER (151), DECEMBER 17, 2015

Name : ....

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Exercise 1. Solve the differential system $X'(t) = AX(t)$, where $A = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 1 & 1 \end{pmatrix}$.

Exercise 2. Explain why $x = 0$ is an ordinary point of the following DE :

$$y'' + xy' - xy = 0.$$

Find two linearly independent power series solutions of the DE.

Exercise 3. Consider the DE :

$$x^2y'' + x\,y' + (x-1)y = 0.$$

(1) Show that $x_0 = 0$ is a regular singular point of the DE.

(2) Find the indicial roots of $x_0 = 0$.

(3) Solve the DE.