King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

MATH 131 // Major Exam II
(121)
Instructor: Bilal Chanane

ID: ..... Name:..... Section:....

Exercise #1: (12 pts) Solve the following linear system using Gauss elimination

$$\begin{cases} 2x - 2y - z = 1 \\ x - y + 3z = -2 \\ x + y + 2z = 3 \end{cases}$$

Exercise #2: (15 pts) Solve, using the simplex method (only), the linear programming problem,

$$\text{Maximize } z = x + y$$

$$\text{subject to } \begin{cases} x + y \leq 1 \\ 2x + 5y \leq 3 \\ x \leq 5/6 \\ x, y \geq 0 \end{cases}$$

Exercise #3: (10 pts) Find the dual of the linear programming problem,

$$\text{Minimize } z = x_1 + 2x_2 + 5x_3$$

$$\text{subject to } \begin{cases} x_1 - x_2 + 2x_3 \geq 2 \\ -x_1 + 2x_2 + x_3 \geq 3 \\ x_1, x_2, x_3 \geq 0 \end{cases}$$

(Do not solve the resulting system).

Exercise #4: (8 pts) John borrows \$2000 on November 20, 2012 with a simple interest rate of 5%.

(i) What amount must be paid back on November 20, 2013 ?
(ii) What is the value of the loan on November 20, 2013 ?
(iii) What is the interest on the loan ?

Exercise #5: (15 pts) Which is better investment
(i) 8% compounded monthly
(ii) 8.8% compounded continuously
(iii) 8.6% compounded semi-annually ?

Exercise #6: (10 pts) Find the present value of the following ordinary annuities:
$1750 per month for 5 years at 7.3% compounded monthly.

Exercise #7: (12 pts) A debt of $12000 due 9 years from now, is instead to be paid of by 3 payments: $2000 now, $2000 in 4 years, and a final payment at the end of 9 years. What would this payment be if an interest rate of 6% compounded annually is assumed?

Exercise #8: (18 pts) David invested $70000, a portion earning a simple interest rate at 6% per year and the rest earning an interest of 8.2% per year. After one year the total interest earned on these investments was $5021. How much money did he invest at each rate?