KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

MATH 131: FINITE MTHEMATICS

Semester 152
Major Exam One
Monday, February 15, 2016
Allowed time 75 minutes

Name: ID#:

Serial #: Section:

Directions:

1) You must **show all your work** to obtain full credit.
2) You are allowed to use electronic calculators and other reasonable writing accessories that help write the exam.
3) Do not keep your mobile with you during the exam, turn off your mobile and leave it aside.

Question No	Full Marks	Marks Obtained
Q1	10	
Q2	4	
Q3	5	
Q4	6	
Q5	3	
Q6	5	
Q7	8	
Q8	9	
Total	50	

1. The ABC Company manufactures a particular surgical tool for which the selling price per tool is \$60, variable cost per tool of \$30, total fixed cost of \$460,000.

a. Determine the required sales tools to earn a profit of $200,000. (3 marks)

b. How many tools must be produced and sold in order to earn a profit of no less than $350,000? (3 marks)

c. What will be the profit of the company if the company produces 16000 tools? (2 marks)

d. Find the break even quantity. (2 marks)

2. Haamad wishes to invest his savings of 25,000 riyals in two enterprises so that the total income per year will be 1580 riyals. One enterprise pays 6% annually, the other has more risk and pays $7\frac{3}{4}\%$ annually. How much must be invested in each enterprise? (4 marks)

3. In two years time, Alison company will began an expansion program. It has decided to invest $4,000,000 now so that in two years $4,345,000, the amount required for the expansion. What is the annual rate of interest, compounded annually, that the company must receive to achieve its purpose? (5 marks)

4. The current ratio of Precision Machine Products is 3.8. If the firm's current assets are $570,000, what are its current liabilities? To raise additional funds, what is the maximum amount the company can borrow on a short term basis if the current ratio is to be no less than 2.6? (6 marks)

5. Given the demand equation $3q + p - 40 = 0$ & the supply equation $2q - p + 10 = 0$ where p is the unit price in dollars and q represents the quantity in units of a thousand, determine the equilibrium quantity and equilibrium price. (3 marks)

6. A chemical manufacturer wishes to fill an order for 700 gallons of a 24% acid solution. Solutions of 20% and 30% are in stock. How many gallons of each solution must be mixed to fill the order? (5 marks)

7. The monthly profit (in hundreds of dollars) for a heavy duty equipment company from the sale of drilling machines is given by:

$P(x) = -x^2 + 18x + 144$, Where x is the number of drilling machines sold.

a. Find the number of drilling machines that will maximize the profit, also find that profit. (3 marks)

b. Find the vertex, intercepts, and graphs the profit function. (5 marks)

8. A firm produces three products, A, B, and C that require processing by three machines, I, II, and III. The time in hours required for processing one unit of each product by the three machines is given by the following table:

	A	B	C
I	3	1	2
II	1	2	1
III	2	4	1

Machine I is available for 490 hours, machine II for 310 hours, and machine III for 560 hours. Find how many units of each product should be produced to make use of all the available time on the machines.
(Note: Solve the problem by matrix reduction method.) (9 marks)