

Name: _____

<i>I</i>	<i>D</i>	:								
<i>N</i>	<i>O</i>	:								

<i>SECTION</i>	<i>No.</i>	0 1	0 2	0 3	0 4	0 5
<i>CLASS</i>	<i>TIME</i>	8 am	7 am	10 am	11 am	9 am

<i>INSTRUCTOR</i>	<i>DR. RAJA MOHAMMAD LATIF</i>	<i>DR. UWE SCHAUZ</i>
<i>CIRCLE</i>	<i>YES</i>	<i>YES</i>

TIME ALLOWED: TWO HOURS (9 : 00 PM – 11 : 00 PM).Wednesday, March 31, 2010.

NOTE: 1. The questions are not in any order of difficulty at all.

2. All questions may not carry equal number of marks.
3. Only the nonprogramable calculators are allowed.
4. All types of PAGERS, OR MOBILES ARE NOT ALLOWED to be with you during the examination.
5. Write your name, ID number and Section number on the examination paper and circle the name of your instructor.
6. After the complete solution with all necessary steps of each problem write your answer clearly.
7. Count that the exam has Thirteen Questions and Fourteen Pages.

Qn#	Maximum Marks	Marks Obtained	Any necessary remarks concerning the solution.
1	6		
2	10		
3	10		
4	6		
5	10		
6	6		
7	10		
8	10		
9	10		
10	10		
11	10		
12	6		
13	6		
Sum	1 1 0		

Q1.(Marks : 6) . A chemist must prepare 360 ml of a chemical solution made up of 3 parts alcohol, 2 parts acid and 4 parts water.

How much of each should be used?

Alcohol : = _____ ml.

Acid : = _____ ml.

Water : = _____ ml.

Q2. (*Marks* : 10) . The Dryman Company produces umbrellas at a variable cost of \$ 12 per umbrella. The fixed costs are \$ 160,000.

How many umbrellas must be produced and sold in order to achieve a profit of \$ 120,000, if the selling price is \$ 20 per umbrella?

Number of Umbrellas : = _____.

Q3. (*Marks* : 10) . New Kork Rimes produces a newspaper for \$ 1.20 per copy.

The fixed cost is \$ 7,000 per day.

The selling price is only \$ 1.00 per each copy,

but the company also obtains \$ 0.50 for each copy sold beyond 10,000 per day.

What is the least (minimum) number of copies that must be sold per day so as to obtain a profit?

Minimum Number of Copies : _____.

Q4. (*Marks : 6*). Find the slope-intercept form of the line through the point $\left(1, \frac{1}{3}\right)$ parallel to the line given by

$$2x + 3y + 4 = 0.$$

$$y = Ax + B$$

where $A =$ _____

$B =$ _____.

Q5. (*Marks* : 10) . A manufacturer of shishas will place on the market 3,000 shishas when the price is SR 200 and 2,000 shishas when the price is SR 150.

Find the supply equation, assuming that the price p and the quantity q are linearly related.

How many shishas will the manufacturer supply if the price is SR 220?

Supply Equation : = _____

Number of Shishas : = _____.

Q6. (*Marks : 6*). The daily profit for the garden department of a store from the sale of trees is given by

$$P(x) = -x^2 + 18x + 144,$$

where x is the number of trees sold.

Determine the number of trees required to be sold to make a maximum profit and find the maximum profit.

Number of trees $x =$ _____

Maximum Profit : = _____.

Q7. (*Marks : 10*). Solve the following system of equations:

$$\begin{cases} x - 2y & = & 4 \\ 2x - 3y + 2z & = & -2 \\ 4x - 7y + 2z & = & 6 \end{cases}$$

$$x = \underline{\hspace{10cm}},$$

$$y = \underline{\hspace{10cm}},$$

$$z = \underline{\hspace{10cm}}.$$

Q8. (*Marks : 10*). Solve the following system of equations:

$$\begin{cases} 2y &= \sqrt{x+2} \\ x+2y &= 4 \end{cases}$$

Answer: $x =$ _____,

$y =$ _____.

Q9. (*Marks* : 10). Find the equilibrium point (q, p) if the supply and demand equations of a product are

$$p = \frac{q}{20} + 5$$

and

$$p = \frac{3000}{q}, \text{ respectively.}$$

$$q = \underline{\hspace{4cm}}$$

$$p = \underline{\hspace{4cm}}$$

Q10. (*Marks* : 10) . A company pays skilled workers in its assembly department \$ 15 per hour. Semiskilled workers in that department are paid \$ 9 per hour. Shipping clerks are paid \$ 10 per hour. Because of an increase in orders, the company needs to hire a total of 70 workers in the assembly and shipping departments. It will pay a total of \$ 760 per hour to these employees. Because of a union contract, twice as many semiskilled workers as skilled workers must be employed. How many semiskilled workers, skilled workers, and shipping clerks should the company hire?

System of Equations:

{ _____

Number of Skilled Workers: = _____

Number of Semi-Skilled Workers: = _____

Number of Shipping Clerks: = _____

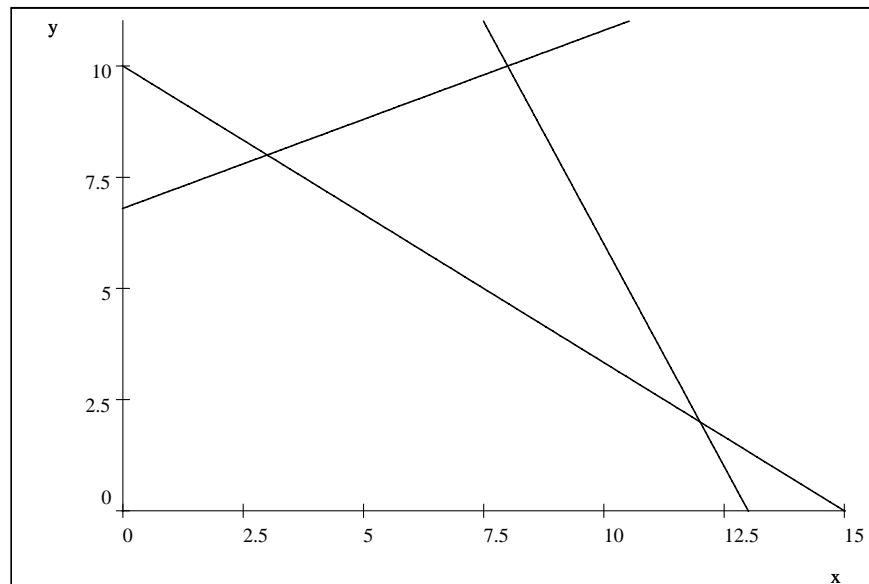
Q11. (Marks : 10) . Use the Geometric Method to solve the following linear programming problem by shading the feasible region of the system of inequalities and finding the corner points of it and then calculating the value of the objective function P at each corner point.

Maximize and Minimize: $P = 20x + 10y$

subject to the constraints:

$$\begin{cases} 2x + 3y \geq 30 \\ 2x + y \leq 26 \\ -2x + 5y \leq 34 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

Graph :



Corner Points	Value of $P = 20x + 10y$	Maximum	Minimum
(_____, _____)			
(_____, _____)			
(_____, _____)			
(_____, _____)			
(_____, _____)			

Maximum Value of $P =$ _____

at _____

Minimum Value of $P =$ _____

at _____

Q12. (*Marks : 6*). *Nutrition : Fertilizer*. A farmer can buy four types of fertilizer.

Each barrel of mix *A* contains 30 pounds of phosphoric acid, 50 pounds of nitrogen, and 30 pounds of potash;

each barrel of mix *B* contains 30 pounds of phosphoric acid, 75 pounds of nitrogen, and 20 pounds of potash;

each barrel of mix *C* contains 30 pounds of phosphoric acid, 25 pounds of nitrogen, and 20 pounds of potash;

and each barrel of mix *D* contains 60 pounds of phosphoric acid, 25 pounds of nitrogen, and 50 pounds of potash.

Soil tests indicate that a particular field needs 900 pounds of phosphoric acid, 750 pounds of nitrogen, and 700 pounds of potash.

How many barrels of each type of food should the farmer mix together to supply the necessary nutrients for the field?

Set up the system of equations without solution.

{ _____

Q13.(Marks : 6) . You want to buy a total of at least 1000 eggs.

A package of type A contains 25 eggs, and a package of type B contains 20 eggs.

Suppose that only 40 packages of type B are available.

Set up the linear programming problem (without solution) in order to Minimize the costs, if a package A costs SR 6 and a package B costs SR 4.

Minimize: (Cost) $C =$ _____

subject to the constraints:

{ _____

{ _____
