

Notes: Answer all questions

Quation 1:- Use gradient method to determine the minimum of  $f(x) = 0.2x_1^2 + x_2^2 - 0.08x_1$  starting from  $x_0 = [4 \ 4]^T$ . DO three steps only

(15 Marks)

Quation 2:- Reddy Mikks produces both interior and exterior paints from two raw materials,  $M_1$  and  $M_2$ . The following table provides the basic data of the problem:

	Tons of raw material per ton of		Maximum daily availability (tons)
	Exterior paint	Interior paint	
Raw material, $M_1$	6	4	24
Raw material, $M_2$	1	2	6
Profit per ton (\$1000)	5	4	

A market survey restricts the maximum daily demand of interior paint to 2 tons. Additionally, the daily demand for interior paint is exactly 1 ton higher than that for exterior paints. Reddy Mikks wants to determine the optimum (best) product mix of interior and exterior paints that maximizes the total daily profit.

(15 Marks)

Quation 3 if the point B is maximize the objective function

$$z = 40x_1 + 88x_2$$

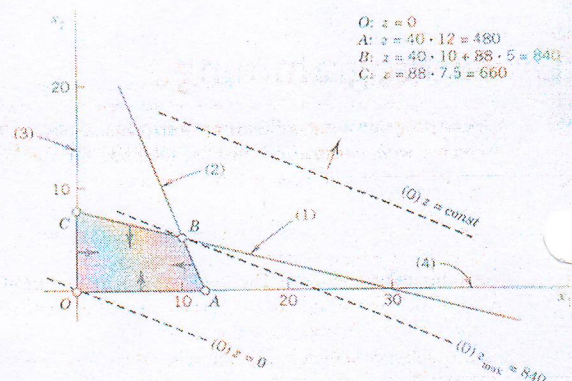
Subjected to the following constraints

$$2x_1 + 8x_2 \leq 60$$

$$5x_1 + 2x_2 \leq 60$$

$$x_1, x_2 \geq 0$$

Determine the worth per unit for each resource. Show the Feasible region in each case.



(15 Marks)

Quation 4: Minimize  $z = 4x_1 + x_2$

Subjected to

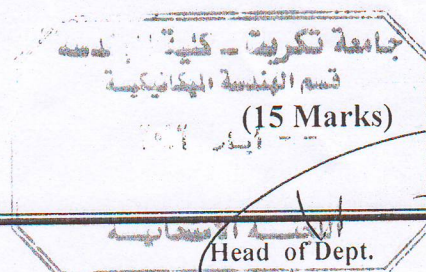
$$3x_1 + x_2 = 3$$

$$4x_1 + 3x_2 \geq 6$$

$$x_1 + 2x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

by using Simplex method.



Lecturer

Dr. Tahseen Taha

Dr. Hameed T-Khalaf