**Samples of problems midterm #2**

**Problem#1** ( 2.5 points) Calculate a total differential ( dU) of the following function:



**Problem #2 ( 2.5 points)** Find a total derivative (dz/dt) of the following function

 where 

**Problem#3 (2. 5 points)** For F(x,y,z)=0 use implicit function differentiation to find 



**# 4 (5 points)** Find the derivatives of implicit functions:

$$axz-xy-w=0$$

$$y-w^{2}-bz=0$$

$$w^{2}+z^{3}-dzw=0$$

Find $\frac{∂x}{∂z}; \frac{∂y}{∂z}$ at point (x,y,w,z)=(0,1,1,0)

a - is the fifth digit of your KIMEP ID (in case of 0 take 10);

b – is the sixth digit of your KIMEP ID (in case of 0 take 10);

**Problem #5 (7.5 points)**

 A firm has the following total cost TC=  and demand functions:

 Q=300-p.

1. Find the output level and price at which the firm can maximize its profit.
2. Find the output level and price at the perfect competitive market.

**Problem #6 (7.5 points)**

A small manufacturing company produces two types of product Q1 and Q2 and sells them at a price 500 and 1000 per unit, respectively. The cost function for this company is



where Q1 is the number of units of first type of product produced, Q2 is the number of units of second type of product produced. How many of each type of product should be produced to realize a maximum profit? What is the maximum profit?

**Problem #7 (2.5 points)**

Transform the following functions to their exponential forms:

1. Y=2(7)2t  b) Y=83t

**Problem #8 ( 2.5points)**

Find derivatives

1. Y=2te3t+4  b) y= 5tln(2/(1-2x))

**Problem #9** **(5 points)**

Find the extreme values, if any, of the following function:

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