

**KABARAK**



**UNIVERSITY**

**EXAMINATIONS**

**2008/2009 ACADEMIC YEAR**

**FOR THE DEGREE OF BACHELOR OF ECONOMICS  
AND MATHEMATICS**

**COURSE CODE: MATH 328**

**COURSE TITLE: REGRESSION ANALYSIS**

**STREAM: Y3S2**

**DAY:**

**TIME:**

**DATE:**

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**INSTRUCTIONS:**

**Answer question ONE and any other TWO**

**PLEASE TURN OVER**

### **QUESTION ONE (30 MARKS)**

a) What do you understand by the following?

- i) Simple regression (**1mark**)
- ii) Scatter diagram (**1mark**)
- iii) The error term (**1mark**)
- iv) Coefficient of determination (**1mark**)

b) The table given below reports the aggregate consumption Y in billions and disposal income X in billions for a developing economy for 12 years

Year	n	$Y_i$	$X_i$
1988	1	102	114
1989	2	106	118
1990	3	108	126
1991	4	110	130
1992	5	122	136
1993	6	124	140
1994	7	128	148
1995	8	130	156
1996	9	142	160
1997	10	148	164
1998	11	150	170
1999	12	154	178

- i) Draw a scatter diagram for the above data (**3 marks**)
- ii) Find the regression equation(**6marks**)
- iii) Plot the regression line and show the deviations of actual values from the estimated values (**3marks**).
- iv) Test at the 5% level of significance for the statistical significance for the parameters (**8marks**).
- v) Find the correlation coefficient(**4marks**)
- vi) Find the coefficient of determination (**2marks**)

### **QUESTION TWO(20 MARKS)**

a) Four experimenters determine the moisture content of samples of powder, each man taking a random sample from each of the six consignments. Discuss whether there is any significant difference between consignments or between observers at 5% level of significance (**20 marks**).

Consignment

Observer	1	2	3	4	5	6
1	9	10	9	10	11	11
2	12	11	9	11	10	10
3	11	10	10	12	11	10
4	12	13	11	14	12	10

**QUESTION THREE (20 MARKS)**

- a) The table below gives the hypothetical quantity demanded of a commodity, Y, its price,  $X_1$  and consumers income,  $X_2$  from 1985 to 1999.

Year	Y	$X_1$	$X_2$
1985	40	9	400
1986	45	8	500
1987	50	9	600
1988	55	8	700
1989	60	7	800
1990	70	6	900
1991	65	6	1000
1992	65	8	1100
1993	75	5	1200
1994	75	5	1300
1995	80	5	1400
1996	100	3	1500
1997	90	4	1600
1998	95	3	1700
1999	85	4	1800

- (i) Fit an OLS regression to these observations (**6marks**)
- (ii) Test at the 5% level of significance of the slope parameter (**7marks**).
- (ii) Find the partial correlation coefficients and indicate which independent variable contributes more to the explanatory power of the model (**7marks**).

**QUESTION FOUR (20 MARKS)**

The table below gives the Bushels of corn per acre  $Y$  resulting from the use of various amounts of fertilizers  $X_1$  and insecticides  $X_2$  produced on a farm in each of 10 years from 1971 to 1980.

Year	n	Y	$X_1$	$X_2$
1971	1	40	6	4
1972	2	44	10	4
1973	3	46	12	5
1974	4	48	14	7
1975	5	52	16	9
1976	6	58	18	12
1977	7	60	22	14
1978	8	68	24	20
1979	9	74	26	21
1980	10	80	32	24

- (i) Find the regression equation using Matrix approach (**12 marks**).
- (ii) Obtain the standard errors of the estimates of the parameters using Matrix approach (**8 marks**).

**QUESTION FIVE (20 MARKS)**

A trucking company wishes to test the average life of each of the four brands of tyres. The company uses all brands on randomly selected trucks. The records showing the lives (thousand of miles) of tyres are given below.

Brand 1	Brand 2	Brand 3	Brand 4
20	19	21	15
23	15	19	17
18	17	20	16
17	20	17	18
	16	16	

Test the hypothesis that the average life for each brand of tyres is the same. Assume  $\alpha = 0.01$  (**20 marks**)