



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
**FACULTY OF SOCIAL SCIENCES**  
**DEPARTMENT OF ECONOMICS**  
**2020\_2 EXAMINATION ...**

**COURSE TITLE: APPLIED QUANTITATIVE ANALYSIS**

**COURSE CODE: ECO 729**

**UNITS: 2.**

**TIME ALLOWED: 2 HOURS**

**INSTRUCTION: ANSWER QUESTION (ONE) AND ANY OTHER (TWO)**

**Question 1**

If an insurance premium ( $x$ ) is depending on driving experience ( $y$ ) in a regression model. And the following summation results were computed from a random sample of eight drivers insured with a company and having similar auto insurance policies.

$$\sum x = 90, \sum y = 474, \sum xy = 4739, \sum x^2 = 1396 \text{ and } \sum y^2 = 29,642$$

- i. Compute  $SS_{xx}$ ,  $SS_{yy}$ , and  $SS_{xy}$  **(5 marks)**
- ii. Find the least squares regression line **(5 marks)**
- iii. Interpret the meaning of the values of the parameters (intercept and the slope) **(5 marks)**
- iv. Calculate  $r$  and  $r^2$  and explain what they mean. **(5 marks)**
- v. Predict the monthly auto insurance premium for a driver with 10 years of driving experience. **(5 marks)**
- vi. Compute the standard deviation of errors. **(5 marks)**

**Question 2**

- a) If the results of quantitative research are to be considered useful and trustworthy, there are several key issues that must be considered and addressed as part of the experimental design and analysis. Discuss these key issues. **(10 marks)**
- b) Suppose the linear trend line method on the quarter (Q1, Q2, Q3, and Q4) strips of data result in the following trend lines given below
  - i. Q1 trend line:  $Y = 58.8 + 6.0571X$  **(2 marks)**
  - ii. Q2 trend line:  $Y = 89.4 + 8.7429X$  **(2 marks)**
  - iii. Q3 trend line:  $Y = 107.6 + 9.8286X$  **(2 marks)**
  - iv. Q4 trend line:  $Y = 39.2 + 5.3714X$  **(2 marks)**From these summarized trend lines, project the quarter's year 7 demand, given  $X = 7$  and compute the total forecast for year 7 **(2 marks)**

### Question 3

a) Define these following concepts associated with inventory control theories

- i. Ordering (Replacement) Costs **(2 marks)**
- ii. Holding (Carrying) Costs **(2 marks)**
- iii. Economic Ordering Quantity (EOQ) **(2 marks)**
- iv. Economic Batch Quantity (EBQ) **(2 marks)**

b) Let us consider the case of Midwestern Manufacturing Company. That firm's demand for electrical generators over the period 2004–2010 was given. A trend line to predict demand ( $Y$ ) based on the time period can be developed using a regression model. If we let 2004 be time period 1 then 2005 is time period 2 and so forth.

	2004	2005	2006	2007	2008	2009	2010		
X	1	2	3	4	5	6	7		
Y	74	79	80	90	105	142	122		

Find the regression line and estimate the demand for 2011 and 2012, if  $X = 8$  and  $9$  respectively **(12 marks)**

### Question 4

- a) Explain briefly the types of decision-making environments, that people make depend on how much knowledge or information they have about the situation. **(6 marks)**
- b) Outline and explain the basic steps you can use in analysing a quantitative techniques problem **(14 marks)**

### Question 5

- a) With appropriate formulas and Notation, explain the basic probability rules, where  $A$  and  $B$  are two events.
- b) Find  $V(X)$  for the following probability distribution:

X	8	12	16	20	24
P(X)	1/8	1/6	3/8	1/4	1/12

**(20 marks )**