



MUEO

# **MOI UNIVERSITY**

**OFFICE OF THE DEPUTY VICE CHANCELLOR, ACADEMIC AFFAIRS,  
RESEARCH & EXTENSION**

## **UNIVERSITY EXAMINATIONS 2013/2014 ACADEMIC YEAR**

***END OF SEMESTER I EXAMINATIONS***

**FOR THE DEGREE OF  
MASTER OF BUSINESS ADMINISTRATION**

**EXAM CODE:- MBA 860**

**COURSE TITLE:- QUANTITATIVE METHODS OF  
MANAGEMENT**

**DATE:- 3<sup>RD</sup> FEBRUARY, 2014      TIME:- 9.00A.M. - 12.00 NOON.**

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INSTRUCTION TO CANDIDATES

➤ SEE INSIDE.

THIS PAPER CONSISTS OF (3) PRINTED PAGES

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Instruction to Candidates:

Answer Question ONE and any other THREE Questions

QUESTION ONE

- a) With examples distinguish between the following paired terms:
- i. Dependent and Independent Events.
  - ii. Complimentary and Equally likely Events
  - iii. Type I and Type II errors (9 marks)
- b) State and explain the two assumptions of the analysis of variance. (3 marks)
- c) The following data presents the number of units of production per day turned out by different workers using 4 different types of machines.

**Machine Type**

Workers	1	2	3	4
A	42	48	68	80
B	50	66	52	94
C	62	68	76	78
D	34	78	64	82
E	52	70	70	66

Carry out an analysis of variance and state whether there is any significant difference in machine type. (7 marks)

- d) Discuss the properties of the general Normal Distribution. Outline the importance of this distribution in research. (3 marks)

e) Briefly discuss the application of quantitative methods in management. (3 marks)

(Total marks 25)

## QUESTION TWO

a) In the context of time series, explain the following terms:

- (i) Secular trend.
- (ii) Seasonal variations.
- (iii) Cyclical variation.
- (iv) Residual variations.

(8 marks)

(b) The following table gives the quarterly demand for the hotel accommodation, in thousands of beds.

Year	Quarter	1	2	3	4
1995		19.4	20.6	19.5	22.8
1996		22.3	22.6	21.0	24.9
1997		23.3	24.1	22.2	25.6
1998		25.1	27.3		

### Required:

- (i) The trend and the average seasonal variation of the series. (14 marks)
- (ii) Explain how this information could be used in forecasting future demand in hotel accommodation? (3 marks)

(Total marks 25)

## QUESTION THREE

a) A factory was producing electric bulbs of average length of 2000 hours. A new manufacturing process was introduced with the hope of increasing the length of the life of bulbs. A sample of 25 bulbs produced by the new process was examined and the average length of life was found to be 2200 hours. Examine whether the average length of bulbs was increased assuming the length of lives of bulbs follow normal distribution with standard deviation  $\sigma = (\alpha 0.05)$ . (13 marks)

b) The mean life of 100 bulbs produced by a company is computed to be 1570 hours with S.D. of 120 hours. The company claims that the average life of bulbs produced by the company is 1600 hours. Using 5% level of significance, is the claim acceptable?

(12 marks)

(Total marks 25)

## QUESTION FOUR

- a) The table below shows the sales of Eldo electronics established in the late 2007

Year	2008	2009	2010	2011	2012	2013
Sales Ksh '000'	5	9	14	18	21	27

Required

- (i). Draw a scatter diagram
- (ii). Find the coefficient of determination
- (iii). Find the equation of the line of best fit using **the** regression formula
- (iv). Predict the sales for the year 2015, giving your answer to the nearest Sh.

(18 marks)

- b) State and explain the properties of a good estimator

(7 marks)

**(Total marks 25)**

## QUESTION FIVE

- a) A company manufactures mountain and racing bikes. Each **mountain** bike is sold at Sh. 6,375 and a racing bike is sold at Sh. 9,000. A racing bike requires 6 kilogrammes of aluminium while a mountain bike requires 4 kilogrammes of aluminium. Aluminium cost Sh. 750 per kilogramme. It costs the company Sh. 375 per hour to assemble each bike (irrespective of model). It takes 1 hour to assemble a racing bike and 2 hours to assemble a mountain bike. There are 4,800 kilogrammes of aluminium available and a total of 1,600 hours available for assembly.

**Required:**

- (i) Formulate the linear programming problem. (4 marks)
- (ii) Graphically solve the problem formulated in (i) above. (8 marks)

- b) Acting as consultants, you have estimated the demand curve of a client's firm to be;  
 $MR = 100 - 8Q$

Where MR is marginal revenue in millions of shillings, Q is the output in units and also to note is that  $TR = 0$  when  $Q = 0$ .

Investigations of the client firm's cost profile shows that marginal cost ( $\dot{M}C$ ) is given by:

$$MC = Q^2 - 14Q + 61 \text{ (in millions of shillings)}$$

Further investigations have shown that the firm's cost when not producing output is Sh. 10 million.

**Required:**

- (i) The equation of total cost. (5 marks)
- (ii) The equation of total revenue (3 marks)
- (iv) The level of output that maximizes profit (5 marks)

**(Total marks 25)**

**QUESTION SIX**

- a) An insurance company takes a keen interest in the age at which a person is insured. Consequently a survey conducted on prospective clients indicated that for clients having the same age the probability that they will be alive in 30 years time is  $\frac{2}{3}$ . This probability was established using the actuarial tables. If a sample of 5 people was insured now, find the probability of having the following possible outcomes in 30 years.
- i. All are alive
  - ii. At least 3 are alive
  - iii. At most one is alive
  - iv. None is alive
- (13 marks)
- b) Park Tyres Company has just developed a new steel-belted radial tyre that will be sold through a national chain discount store. Because the tyre is a new product, the company's management believes that the mileage guarantee offered with the tyre will be an important factor in the consumer acceptance of the product. Before finalizing the tyre mileage guarantee policy, the actual road test with the tyres shows that the mean tyre mileage is 36,500 Kilometers and the standard deviation is 5,000 Kilometers. In addition, the data collected indicated that a normal distribution is a reasonable assumption.

*Required:*

- i. Yana Tyre Company will distribute the tyres if 20% of the tyres manufactured can be expected to last more than 40,000 Kilometers. Should the company distribute the tyres? (5 marks)
- ii. The company will provide a discount on the new set of tyres if the mileage on the original tyres does not exceed the mileage stated on the guarantee. What should the guarantee mileage be if the company wants no more than 10% of the tyres to be eligible for the discount? (5 marks)

c) Explain briefly some of the advantages of the standard normal distribution. (2 marks)

(Total marks 25)

**E...N...D**