



## GARISSA UNIVERSITY

UNIVERSITY EXAMINATION **2017/2018** ACADEMIC YEAR **TWO**  
**SECOND** SEMESTER EXAMINATION

SCHOOL OF BUSINESS AND ECONOMICS

FOR THE DEGREE OF BACHELOR OF BUSINESS MANAGEMENT

COURSE CODE: ECO 213

COURSE TITLE: ECONOMIC STATISTICS II

EXAMINATION DURATION: 3 HOURS

**DATE: 10/04/18**

**TIME: 09.00-12.00 PM**

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### INSTRUCTION TO CANDIDATES

- The examination has **SIX (6)** questions
- Question **ONE (1)** is **COMPULSORY**
- Choose any other **THREE (3)** questions from the remaining **FIVE (5)** questions
- Use sketch diagrams to illustrate your answer whenever necessary
- Do not carry mobile phones or any other written materials in examination room
- Do not write on this paper

This paper consists of **FIVE (5)** printed pages

*please turn over*



**QUESTION ONE (COMPULSORY)**

- (a) On experience, it is found that Mr. Omondi is late for lecturers on four days of 30 working days. Let  $X$  denotes the number of times Mr. Omondi will be late for lecturers in the next 60 working days. Determine  $P(5 < x < 10)$  **[5 marks]**
- (b) Define the following terms
- i) Degrees of freedom
  - ii) Type II error
  - iii) Sampling distribution
  - iv) Statistic **[4 marks]**
- (c) Calculate the sample size needed to estimate the population average to within 0.50 when the confidence is 90% and population variance is 25 **[3 marks]**
- (d) Below is a sample of earnings (in thousands of shillings) of fast food outlets in Kangemi in a month: 45, 38, 30, 37, 54, 49, 65, 40, 33, 28, 36, 48, 53 and 55 **[6 marks]**
- i. Estimate the average earning of a fast food outlets in Kangemi
  - ii. Determine the 95% confidence interval of a food outlet in Kangemi in a month
- (e) The standard deviation of the life for a particular brand of light bulb is known to be  $\sigma = 400$ hrs and the operating life of the tubes is normally distributed. The manufacturer claims that the average tube life is at least 9100 hrs. Test this claim at 5% level of significance against the alternative hypothesis that mean life is less than 9100 hrs, given the fact that for a sample size of 20 tubes, the mean operating life was 8800hrs **[6 marks]**

**QUESTION TWO**

- (a) The following data represent total expenditure  $Y$  and its four main components (as percentage of gross domestic product) for eleven years

| Year | Total expenditure $Y$ | Interest payments $X_1$ | Subsidies $X_2$ | Security Expenditure $X_3$ | Grants $X_4$ |
|------|-----------------------|-------------------------|-----------------|----------------------------|--------------|
| 1    | 10.5                  | 1.7                     | 0.6             | 3.0                        | 4.3          |
| 2    | 11.6                  | 1.7                     | 1.2             | 2.9                        | 4.7          |



|    |      |     |     |     |     |
|----|------|-----|-----|-----|-----|
| 3  | 12.2 | 1.7 | 1.3 | 2.7 | 4.8 |
| 4  | 13.5 | 1.9 | 1.3 | 2.7 | 5.3 |
| 5  | 13.3 | 2.1 | 1.4 | 2.9 | 4.8 |
| 6  | 13.0 | 2.1 | 1.2 | 2.8 | 4.6 |
| 7  | 13.4 | 2.2 | 1.2 | 2.8 | 4.5 |
| 8  | 14.4 | 2.4 | 1.4 | 3.0 | 5.0 |
| 9  | 12.8 | 2.5 | 1.4 | 2.9 | 5.0 |
| 10 | 14.8 | 2.8 | 1.8 | 3.0 | 5.4 |
| 11 | 15.4 | 3.0 | 2.0 | 3.1 | 6.3 |

Using the above data, the following multi-linear regression model was fitted

$$Y = 12.7302 + 1.9384X_1 + 1.6239X_2 - 2.3213X_3 + 0.1469X_4$$

(6.0635) (1.1680) (1.7295) (2.4648) (0.8841)

$R^2 = 0.8551$  where values in bracket represent the standard errors of the corresponding

- i. Estimate the total expenditure for  
 $X_1 = 2.5$   $X_2 = 1.5$   $X_3 = 3.0$   $X_4 = 5.0$
- ii. Test the significance of the overall model at 5% level of significance
- iii. Test the null hypothesis that the interest payment have no influence on Total Expenditure a 5% level of significance
- iv. Test the alternative hypothesis that security expenditure has positive influence on Total expenditure at 10% level of significance
- v. Test the significance of the regression coefficient  $\beta_4$  at 5% level of significance and interpret your results

### QUESTION THREE

The following table gives the sample data from a survey on income of managing directors of the sampled companies in both Kenya and Tanzania

| Country  | Income (in Euros) |      |      |      |      |      |      |      |      |      |
|----------|-------------------|------|------|------|------|------|------|------|------|------|
| Kenya    | 5000              | 4680 | 4500 | 3200 | 6845 | 6500 | 6065 | 5147 | 4365 | 3933 |
| Tanzania | 3540              | 6500 | 2700 | 3200 | 2760 | 6245 | 5544 | 5498 | 4367 |      |

- (a) Test whether the mean income for each country is above 4000 Euros at 5% level of significance **[10 marks]**
- (b) Construct the 95% confidence level for the mean income of Kenya **[5 marks]**



**QUESTION FOUR**

- (a) A company sells identical soaps in three different wrappings at the same price. The sales for 5 months are given in the table below. Sales data are normally distributed with equal variance. Test at 5% level of significance whether the mean soap sales for each wrapping is equal or not.

[15 marks]

| Wrapping 1 | Wrapping 2 | Wrapping 3 |
|------------|------------|------------|
| 87         | 78         | 90         |
| 83         | 81         | 91         |
| 79         | 79         | 84         |
| 81         | 82         | 82         |
| 80         | 80         | 88         |

**QUESTION FIVE**

- (a) For large population of normally distributed account balance, the mean balance is  $\mu=15000$  Kshs with standard deviation 3500. What is the probability that a randomly account has a balance that
- Exceed 16000 Kshs
  - Lies between 13000 Kshs and 20000 Kshs
  - Is less than 17000 Kshs

[8 marks]

- (b) An owner of a big firm agrees to purchase the product of a factory if the produced items do not have variance of  $0.5\text{mm}^2$  in their length. To be sure of the specification the buyer selects a sample of 18 items from his lot. The length of each item was measured as follows:

18.57, 18.10, 18.61, 18.32, 18.33, 18.46, 18.12, 18.34, 18.57, 18.22, 18.63, 18.43, 18.37, 18.64, 18.58, 18.34, 18.43, 18.63. On the basis of this sample should the buyer purchase the lot at 5% level of significance

[7 marks]



**QUESTION SIX**

(a) A departmental store gives in service training to salesmen followed by a test. It is experienced that the performance regarding sales of any salesman is linearly related to the scores secured by him. The following data give test scores and sales made by nine salesmen during a fixed period.

|                |    |    |    |    |    |    |    |    |    |
|----------------|----|----|----|----|----|----|----|----|----|
| Test score (x) | 16 | 22 | 28 | 24 | 29 | 25 | 16 | 23 | 24 |
| Sales (y)      | 35 | 42 | 57 | 40 | 54 | 51 | 34 | 47 | 45 |

- i. Fit a linear regression model to model the above data by determining a and b in the equation
- ii. Predict sales due to a salesman having the score  $X= 26$  **[6 marks]**

(b) In a study of the television viewing habits of children a development psychologist selects a random sample of 300 first graders- 100 boys and 200 girls. Each child is asked which of the following TV programs they like best Citizen, KTN and NTV. Results are shown in the contingency table below.

| Viewing Preferences |     |         |     |           |
|---------------------|-----|---------|-----|-----------|
|                     | KTN | CITIZEN | NTV | Row Total |
| Boys                | 50  | 30      | 20  | 100       |
| Girls               | 50  | 80      | 70  | 200       |
| Columns             | 100 | 110     | 90  | 300       |

- i. Do boys preference for the TV programs differ significantly from the girls preferences? Use 0.05 level of significant
- ii. Write a report of this analysis **[9 marks]**

