



GARISSA UNIVERSITY

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

SCHOOL OF BIOLOGY AND BIOLOGICAL

FOR THE DEGREE OF BACHELOR OF BUSINESS MANAGEMENT

COURSE CODE: BHR 210

COURSE TITLE: STATISTICS II

EXAMINATION DURATION: 3 HOURS

DATE: 18/04/18

TIME: 09.00-12.00 PM

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 **FOUR (4)** printed pages

please turn over



QUESTION ONE (COMPULSORY)

- (a) Find 7P_3 and 6C_4 Show how you arrive at your answer. **[2 marks]**
- (b) Suppose events A and B are such that: $p(A) = \frac{1}{3}$, $p(B) = \frac{1}{3}$ and $p(A \cup B) = \frac{2}{5}$
 Determine $p(A \cap B)$. Are A and B independent? **[3 marks]**
- (c) A doctor estimates that his treatment of a particular illness is successful 75% of the time. Find the probability that he will successfully treat 5 out of 6 patients who seek his help. **[3 marks]**
- (d) If there are 200 typographical errors randomly distributed in a 500-page manuscript, find the probability that a given page contains exactly 3 errors (Assume Poisson distribution is appropriate) **[3 marks]**
- (e) Explain THREE (3) characteristics of the normal distribution **[3 marks]**
- (f) The length distribution of rods manufactured by Otieno Industries Ltd is normally distributed with mean 90 cm and standard deviation of 8 cm. A rod is selected at random from the production, what is probability that its length would be:
 - (i) Less than 82 cm
 - (ii) More than 104 cm
 - (iii) Between 100 cm and 108 cm **[6 marks]**
- (g) In a regression analysis, it was found that
 $\sum x=57$ $\sum y=511$ $\sum xy=3745$ $\sum x^2=579$ $\sum y^2=38,993$
 - i. Find the Pearson correlation coefficient. Comment on the value obtained. **[3 marks]**
 - ii. Find the coefficient of determination. Comment on the value obtained. **[2 marks]**

QUESTION TWO

The data below is obtained from a study of the number of cars a rental agency has and its annual income.

Company	Cars X (in ten thousand)	Income Y (in Billions)
A	63	7
B	29	3.9
C	20.8	2.1
D	19.1	2.8
E	13.4	1.4
F	8.5	1.5



- i. Find the equation of the regression line. **[6 marks]**
- ii. Predict the income of a car rental agency that has 200,000 automobiles. **[2 marks]**
- iii. Calculate the Karl-Pearson Correlation coefficient and interpret the value obtained **[4 marks]**
- iv. Calculate the coefficient of determination for the data above. Comment on the value obtained **[3 marks]**

QUESTION THREE

- (a) Seventy percent (70%) of all the heart attacks occur during the day and 30% occur at night. If an attack occurs during the day, the probability that the patient survives is 0.9. If the attack occurs at night, the probability that the patient survives is 0.8. Suppose a patient had a heart attack and survived. What is the probability that it occurred at night? **[8 marks]**
- (b) Two machines A and B produce 60% and 50% respectively of the total output of a factory. Of the parts produced by machine A, 3% are defective and of the parts introduced by machine B, 5% are defective. A part is selected at random from a day's production and found to be defective. What is the probability that it came from machine A? **[7 marks]**

QUESTION FOUR

- (a) In a small town, the probability that a woman attends a family planning clinic is 0.4 and the probability that her husband attends the clinic is 0.1. The probability that a husband attends the clinic given that his wife does is 0.08. Find the probability that
 - i. both husband and wife attend clinic **[3 marks]**
 - ii. the wife will attend the clinic given that the husband does **[3 marks]**
 - iii. at least one of the two persons attends clinic **[3 marks]**
- (b) 60% of all households in a city subscribe to the Star Newspaper, while 80% subscribe to the Nation and 50% subscribe to both papers. A household is selected at random. What is the probability that it subscribes to:
 - i. At least one of the two papers **[3 marks]**
 - ii. Exactly one of the two papers **[3 marks]**



QUESTION FIVE

- (a) A committee 4 member is chosen at random from 5 women and 6 men.
- i. In how many ways can the members of the committee be chosen if there are no restrictions?
 - ii. In how many ways can they be chosen if there must be more women than men?
 - iii. Find the probability that committee has only one man **[7 marks]**
- (b) Four items are taken at random from a box of 12 items and inspected. The box is rejected if more than one item is found to be faulty. If there are 3 defective items in the box, find the probability that the box is rejected. **[6 marks]**
- (c) A four-digit number is formed from the numbers 2, 3, 4 and 5. Find the probability that the number formed is divisible by 5. **[2 marks]**

QUESTION SIX

- (a) The letters of the word **MISSISSIPPI** were randomly arranged. What is the probability that the 2 Ps are placed together **[5 marks]**
- (b) The following table shows the personal wealth of a certain section of the population of a certain country for a particular year.

Personal wealth (US \$)	Number of persons (in hundred thousands)	Total Personal wealth (US \$ '000 Million)
0 – 2000	19	2.4
2,000 – 5,000	26	7.8
5,000 – 10,000	74	55.5
10,000 – 15,000	41	49.2
15,000 – 20,000	16	25.7
20,000 – 25,000	8	16.8
25,000 – 50,000	5	15
≥ 50,000	1	6.3

Draw a Lorenz curve to illustrate the data. Briefly comment on the curve **[10 marks]**

