



GARISSA UNIVERSITY

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

SCHOOL OF BUSINESS AND ECONOMICS

FOR THE DEGREE OF BACHELOR OF BUSINESS MANAGEMENT

COURSE CODE: BBM 221/BHR 200

COURSE TITLE: BUSINESS STATISTICS

EXAMINATION DURATION: 3 HOURS

DATE: 01/12/17

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 **FIVE (5)** printed pages

please turn over



QUESTION ONE (COMPULSORY)

- (a) Define the following terms as used in Business Statistics:
 - i. Linear regression
 - ii. Correlation
 - iii. Range
 - iv. Absolute Mean Deviation for an ungrouped data **[4 Marks]**
- (b) The mean mark of 100 students was found to be 40. Later, it was discovered that a mark 53 was misread as 83. Find the correct mean mark. **[3 Marks]**
- (c) The data given below represents Continuous Assessment Marks (CAT) marks scored by 7 students in a Business Statistics class (marked out of 30): 13, 7, 27, 18, 21, 15, 18. Determine :
 - i. Inter-quartile range for the marks **[2 Marks]**
 - ii. The Absolute Mean Deviation. What does it represent? **[3 Marks]**
- (d) Find the coefficient of correlation for the four pairs (x, y) given in the table below:

x	2	3	6	5
y	5	4	12	8

- [5 Marks]**
- (e) (i) If A and B are events in a sample space S and $A \subset B$, prove that $Pr(A) \leq Pr(B)$
[3 Marks]
 - (ii) Determine the probability of selecting at random a man and a woman from a crowd containing 20 men and 33 women **[2 Marks]**
- (f) A package contains 50 similar components and inspection shows that four have been damaged during transit. If six components are drawn at random from the contents of the package, determine the probability that in this sample less than three are damaged. **[3 Marks]**

QUESTION TWO

- (a) The mean height of 100 people is 170cm and the standard deviation is 9cm. Assuming the heights are normally distributed, determine the number of people likely to have heights between 150cm and 195cm. **[5 Marks]**



(b) The table below shows the age distribution of workers in a factory:

Age in years	16-20	21-25	26-30	31-35	36-40	41-45	46-50
Frequency	2	10	12	17	15	9	5

- i. Calculate the mean age to the nearest year
- ii. Estimate the median age
- iii. Estimate the modal age
- iv. Calculate the variance and standard deviation for the ages of workers in the factory

[10 Marks]

QUESTION THREE

- (a) If 3% of the gear wheels produced by a company are defective, determine the probabilities that in a sample of 80 gear wheels more than two will be defective. [5 Marks]
- (b) Fifteen students appeared in a competitive test for admission to a popular computer course. They were ranked and found distributed according to their ranks as given below :

Ranks	01-03	04-06	07-09	10-12	13-15
Frequencies	2	4	5	3	1

Obtain the following:

- i. Second moment about the mean, μ_2
- ii. Fourth moment about the mean, μ_4
- iii. Moment coefficient of kurtosis, β_2
- iv. $\gamma_2 = \beta_2 - 3$ and comment on the type of the distribution

[10 Marks]



QUESTION FOUR

The relationship between monthly car sales and income and sales of petrol for a garage is as shown below:

Car Sold	Income from petrol sales
2	12
5	9
3	13
12	21
14	17
7	22
3	31
28	47
14	17
7	10
3	9
13	11

Determine the linear coefficient of correlation between these quantities and comment about your results. **(15 marks)**

QUESTION FIVE

- (a) Given a regression line Y on X , explain briefly what you understand by the terms linear interpolation and linear extrapolation **[3 Marks]**
- (b) Given the equation of the least square regression line as $Y = a_0 + a_1x$, write down two equations which make sum of the “deviations squared” a minimum, stating briefly what their symbols mean(if any). **[2 Marks]**
- (c) Given the bivariate data,



X	1	5	3	2	1	1	7	3
Y	6	1	0	0	1	2	1	5

Fit a regression line Y on X and hence predict y if $x = 10$ **[6 Marks]**

(d) A group of 8 Accountancy students are tested in Business Statistics (BS) and Management Accounting (MA). Find the value of Spearman's rank correlation coefficient between the marks for BS and MA.

Candidate	A	B	C	D	E	F	G	H
Score in BS	12	78	52	32	36	41	27	28
Score in MA	22	60	64	61	38	41	37	36

[4 Marks]

QUESTION SIX (15 MARKS)

(a) (i) By writing: $\sqrt[n]{x_1 x_2 \dots x_n}$ as $(x_1 x_2 \dots x_n)^{1/n}$ and taking logarithms in the formula for the geometric mean (GM), show that the logarithm of the GM is the mean of the logarithms of the original values. **[3 Marks]**

(ii) Hence or otherwise determine the geometric mean for the following distribution:

Class interval	1-5	6-10	11-15	16-20
Frequency	20	40	30	10

[4 Marks]

(iii) Determine the harmonic mean for the distribution in (ii) above **[4 Marks]**

(b) Estimate the mode, and then determine the range and coefficient of range for the following distribution:

Class	9.3-9.7	9.8-10.2	10.3-10.7	10.8-11.2	11.3-11.7	11.8-12.2
Frequency	2	5	12	18	14	6

[4 Marks]

