JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

SECOND YEAR FIRST SEMESTER UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN ANIMAL SCIENCE/HORTICULTURE
2016/2017 ACADEMIC YEAR

REGULAR

COURSE CODE: AAS 3211/AHT 3211

COURSE TITLE: INTRODUCTION TO STATISTICS/ INTRODUCTORY STATISTICS

EXAM VENUE: **STREAM: BSc. (Animal Science/Horticulture)**

DATE: **EXAM SESSION:**

TIME: 2 HOURS

Instructions:

1. **Answer ALL questions in section A and ANY other 2 Questions in section B.**
2. **Candidates are advised not to write on question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

SECTION A: [30 MARKS]

Answer ALL questions from this Section.

QUESTION ONE [SIX MARKS]

Define the following terms with examples:

a. Population [2 Marks]
b. Measure of variability [2 Marks]
c. Discrete Qualitative variable [2 Marks]

QUESTION TWO [SIX MARKS]

For the data:

55	85	90	50	110	115	75	85	8	23
70	65	50	60	90	90	55	70	5	31

Compute the:

a. Mode [1 Mark]
b. Mean [2 Marks]
c. Median [3 Marks]

QUESTION THREE [NINE MARKS]

For the following measurements:13, 21, 9, 15, 13, 17, 21, 9, 19, 23, 11, 9, 21. Find the:

a. Median [2 Marks]
b. Lower and upper quartiles [4 Marks]
c. Quartile deviation [3 Marks]

QUESTION FOUR [NINE MARKS]

A person visits her doctor with concerns about her blood pressure. If the systolic blood pressure exceeds 150, the patient is considered to have high blood pressure and medication may be prescribed. A patient's blood pressure readings often have a considerable variation during a given day. Suppose a patient's systolic blood pressure readings during a given day have a normal distribution with mean 160mm mercury and a standard deviation 20 mm.

a. What is the probability that a single blood pressure measurement will fail to detect that the patient has high blood pressure? [3 Marks]
b. If five blood pressure measurements are taken at various times during the day, what is the probability that the average of the five measurements will be less than 150 and hence fail to indicate that the patient has high blood pressure? [3 Marks]
c. How many measurements would be required in a given day so that there is at most 1% probability of failing to detect that the patient has high blood pressure? [3 Marks]

SECTION B: [40 MARKS]

Answer ANY TWO questions from this Section.

QUESTION FIVE [20 MARKS]

a. In an inspection of automobiles in Bondo town, 60% of all automobiles had emissions that did not meet Nema regulations. For a random sample of 10 automobiles, compute the following probabilities:

i. Exactly 6 of the 10 failed the inspection [3 marks]

ii. Six or more failed the inspection [3 marks]

b. The College Boards, which administer many thousands of high school students, are scored so as to yield a mean of 500 and a standard deviation of 100. These scores are close to being normally distributed. What percentage of the scores can be expected to satisfy each condition?

i. Greater than 600 [4 marks]

ii. Greater than 700 [3 marks]

c. An agricultural store has the following entries in one of the records.

Unit	Yield	Treatment	Variety	Remarks
1	11.8	A	1	Good
2	7.8	B	1	Poor
3	9.7	C	2	Fair
4	6.4	D	2	Poor
5	8.3	A	3	Fair
6	10.6	B	3	Good
7	15.5	C	4	Excellent
8	14.8	D	4	Excellent

Using the table answer the questions:

i. Identify the observations [1 mark]

ii. Identify the variables in the dataset [2 marks]

iii. Classify each piece of information according to its measurement scale [4 marks]

QUESTION SIX [20 MARKS]

The county assembly in Siaya plans to expand the items on which cess tax would be imposed. 30 possible tax rates (as percentage of value of goods) were proposed as follows.

26	28	30	37	33	30
29	39	49	31	38	36
33	24	34	40	29	41
40	29	35	44	32	45
35	26	42	36	37	35

a. i. Represent the proposals using a frequency polygon [7 marks]
   ii. Determine the modal tax rate [1 mark]
b. Given that $\sum(y - \bar{y})^2$ = 1,069.3667. Compute:
   i. The mean tax rate [3 marks]
   ii. The standard deviation of the tax rate [4 marks]
c. Determine the median tax rate [5 marks]

QUESTION SEVEN [20 MARKS]

An educational researcher designs a study to compare the effectiveness of teaching English to non-English-speaking people by a computer software program and by the traditional classroom system. The researcher randomly assigns 125 students from a class of 300 to instruction using the computer. The remaining 175 students are instructed using the traditional method. At the end of a 6-month instructional period, all 300 students are given an examination with the results reported below.

	Method of Instruction	
Results	Computer	Traditional
Pass	94	113
Fail	31	62

a. Determine the probability that:
   i. A student passes the exam [2 marks]
   ii. A student who fails was taught using a computer [2 marks]
b. We wish to test the hypothesis that the results obtained by a student is independent of the method of instruction:
   i. State the hypothesis for the test [2 marks]
   ii. Determine the test statistic [8 marks]
c. i. Compute the critical value at $\alpha = 0.05$ [2 marks]
   ii. Make your conclusion [4 marks]

QUESTION EIGHT [20 MARKS]

a. A clinical trial is conducted to compare two drug therapies for leukemia: P and Q. Thirty-one patients were assigned to drug P and forty-five patients to drug Q. The table below summaries the success of the two drugs:

Drug	Success	Failure

Q	38	7
P	14	17

Is there significant evidence that the response of a patient is independent of the drug used? (α = 0.05) [8 marks]

b. A marketing research firm believes that approximately 12.5% of all persons mailed a betting offer will respond if a preliminary mailing of 10,000 is conducted in a fixed region.

i. What is the probability that 1,000 or fewer will respond? [3marks]

ii. What is the number of respondents if 70% of the people are expected to respond? [3 marks]

c. A fair coin is tossed three times.

i. List all the possible outcomes [3 marks]

ii. Find the expectation of number of tails that show