MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE
DEGREE OF MASTER OF SCIENCE IN AGRICULTURAL
ECONOMICS & MASTER OF SCIENCE IN AGRIBUSINESS
MANAGEMENT

(HOMA BAY CAMPUS)

AEG 800: AGRICULTURAL STATISTICS

Date: 12th April, 2014   Time: 2.00 – 5.00 p.m.

INSTRUCTIONS:

- **Answer Question ONE (COMPULSORY) and any other FOUR
  questions.**

INSTRUCTIONS Answer Five Questions. Question one is compulsory.

QUESTION ONE

I. A group of 50 people were asked which of the three newspapers A,B and C they read. The results showed that 25 read A, 16 read B, 14 read C, 5 read both A and B., 4 read both B and C, 6 read both C and A and 2 read all.

    a. Represent this information in a venn diagram   **(3 marks)**

    b. Find the probability that a person selected at random from both these groups will read

         I. At least 1 newspaper(2 marks)

         II. Only one newspaper (2 marks)

         III. Only A..   (2 marks)

a. The discrete random variable has the following probability distribution.

w	-3	-2	-1	0	1
P(W=w)	0.1	0.25	0.3	0.15	d

Find

     I. The value of d   (2 marks)

     II. $P(-3 \leq W < 0)$ (2 marks)

     III. $P(w > -1)$ (2 marks)

     IV. $P(-1 < W < 1)$ (2 marks)

     V. The mode.   (2 marks)

Student Learning Outcomes:

CLO1 Perform basic statistical calculations Student learning outcomes

1.1 Identify levels of measurement and appropriate statistical measures for a given level of measurement.

1.2 Determine frequencies, relative frequencies, creating histograms and identifying their shape visually.

1.3 Calculate basic statistical measures of the middle, spread, and relative standing.

1.4 Calculate simple probabilities for equally likely outcomes.

1.5 Determine the mean of a distribution.

Course contents

1. Populations and samples
2. Visualizing data
3. Measures of middle and spread
4. Paired data and scatter diagrams
5. Probability
6. Probability distributions
7. Introduction to the normal distribution
8. Normal distribution and z-Values
9. Confidence intervals for the mean
10. Hypothesis testing against a known population mean
11. Hypothesis testing two sample means

D. **Instructional costs** Large screen computer display technology that can viewed with the lights on, routine classroom supplies. Availability of OpenOffice.org Calc software on student accessible computers on campus.

E. **Evaluation** Methods of measurement will include class participation, homework, quizzes, tests, midterm, and final examinations. A final percentage will be calculated by dividing the total points earned by the the total points possible. Grades will be assigned according the following

: 75-100% A;

65-74% B;

50-64

BELOW 50% F.

QUESTION TWO

a. On average, the school photocopier breaks down eight times during a school week. Monday to Friday. Assuming that the number of breakdowns can be modeled using Poisson distribution, find the probability that the machine will break down

I. Five times in a week

II. Once a Monday

III. Eight times in a a fortnight

(6MARKS)

QUESTION THREE

A continuous random variable X has the following p.d.f. f(x)

$$F(x) = \begin{cases} K(x+2)^2 & -2 \le x \le 0 \\ 4k & \\ 0 \text{ otherwise} \end{cases}$$

a. Find the value of the constant k (4 marks)

b. Sketch y=f(x)   (3 marks)

c. Find P(-1≤X≤1)   (3 marks)

d. FIND THE P(X>1)   (3 marks)

QUESTION FOUR

a. State the assumptions of linear regression model. (4 marks)

b. A student found the following information on the life expectancy x in years and thegROSS Domestic Product GDP per head in $y in six countries in South East Asia

COUNTRY	X	Y
AFGHANISTAN	42	143
BANGLADESH	50	179
BHUTAN	47	197
INDIA	58	335
PAKISTAN	57	384
SRI LANKA	73	423

it is require that you estimate the value of x in Nepal given that it s y value is 160

I. Find the equation of a suitable line of regression   (5 marks)

II. Use your equation to obtain the required estimate   (3marks)

III. Use your estimate to estimate the value of x for North Korea whose Y value is   (3 marks)

QUESTION FIVE

A manufacturer claims that a particular brand of seeds has a 90% germination rate. To test this claim, 150 randomly selected seeds are planted and it is noticed that 124 germinate. Does this provide evidence at 1% level of significance that that the manufacturer is overstating the germination rate of the seeds?

(15 MARKS)

QUESTION SIX

A farmer kept a record of the number of heifer calves born to each cow during the first five years of breeding of the cow. The results are summarized in the table below.

Number of heifer	0	1	2	3	4	5
Number of cows	4	19	41	52	26	8

a. Test at 5% level of significance whether or not the binomial distribution with parameters $n=5$, $p=0.5$ is an adequate model for the data. (10 marks)
b. Explain briefly what changes you would make in your analysis if you were testing whether or not the binomial distribution with $n=5$ and unspecified p fitted into the data.   (5 MARKS)

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COURSE OUTLINE

AEG 800. AGRICULTURAL STATISTICS

Course Description: A one semester course designed as an introduction to the basic ideas of data presentation, descriptive statistics, linear regression, and inferential statistics including confidence intervals and hypothesis testing. Basic concepts are studied using applications from education, business, social science, and the natural sciences. The course uses spreadsheet software for both data analysis and presentation.

Course Prepared by: DENNIS OTIENO

A. **Learning Outcome:**
   1. 3.1 Demonstrate understanding and apply mathematical concepts in problem solving *and* in day to day activities
   2. 3.2 Present and interpret numeric information in graphic forms
B. **Course Learning Outcomes:**
   1. Perform basic statistical calculations
   2. Obtain results using normal and t-distributions
   3. Perform linear regressions
C.