

**W1-2-60-1-6**

## JOMO KENYATTA UNIVERSITY

**OF**

**AGRICULTURE AND TECHNOLOGY**

# University Examinations 2014/2015

**YEAR I SEMESTER II EXAMINATION FOR THE DEGREE OF BACHELOR OF COMMERCE**

**HBC 2110: INTRODUCTION TO BUSINESS STATISTICS**

**DATE: AUGUST 2015 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND**

**ANY OTHER TWO QUESTIONS.**

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**QUESTION ONE (30 MARKS)**

(a) i) Define the term Business Statistics. (1 mark)

ii) Distinguish between descriptive and inferential statistics.(3 marks)

(b) A social survey revealed the following earners found per family.

|  |  |
| --- | --- |
| No. of employee | No of family |
| 0 | 117 |
| 1 | 1086 |
| 2 | 616 |
| 3 | 287 |
| 4 | 146 |
| 5 | 47 |
| 6 | 14 |
| 7 | 4 |
| 8 | 1 |

Calculate the mean and the standard deviation. (6 marks)

(c ) Compute the suitable method the index number of qualities given on table below:

2014

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | 2014 |  | 2014 |
| COMMODITY | PRICE | VALUE | PRICE | VALUE |
| A | 800 | 8000 | 10,000 | 11,000 |
| B | 1000 | 90,000 | 1,200 | 10,000 |
| C | 1600 | 25,600 | 200 | 34,000 |

(5 marks)

(d) Two machines are used to network items that are initially defective. If x be the number of hours machine A is in use and Y be the number of hours machine B is in use on a randomly chosen day. Assume x and y have joint probability density function given by:

f(x, y) = 

i) Find the probability that both machines are in operation for more than half an hour. (6 marks)

ii) Find the marginal probability density functions f(x) and fy(y) (2 marks)

iii) Are x and y independent. (2 marks)

**QUESTION TWO (20 MARKS)**

(a) i) Differentiate between a null and an alternative hypothesis.(2 marks)

ii) What is a Type I error in hypothesis testing. (2 marks)

(b) A sample of 74 measures of the length of a species of tilapia was taken form a population which was believed to follow a normal distribution with mean length 78.5cm. Variance 

Determine whether we can assume that the sample came from this population. (8 marks)

(c) Raw materials are tested for purity the process requires a purity of 85%. A random sample is taken with the following results (%)

93.2 87.0 92.1 90.1 87.3 93.6

i) State the appropriate null and alternative hypothesis (3 marks)

ii) Compute the P-value (3 marks)

iii) Should the shipment be accepted? (1 mark)

iv) Explain the reason for your answer in part (ii) (2 marks)

**QUESTION THREE (20 MARKS)**

(a) Define the terms:

i) Department events

ii) Mutually exclusive events

iii) Probability (6 marks)

(b) Number male children born to 120 families is distributed as follows:

No of male children 0 1 2 3 4 5

No. of families 4 18 40 36 20 2

Calculate the probability of make birth (30 marks)

(c) The time customers spend inside a supermarket are observed.

The following are 13.7 time expenditure (in seconds)

|  |  |  |
| --- | --- | --- |
| Time | Observed | Expected |
| 0 – 2 | 18 | 23 |
| 2 – 4 | 28 | 18 |
| 4 – 6 | 14 | 16 |
| 6 – 8 | 7 | 13 |
| 8 – 10 | 11 | 11 |
| 10 – 12 | 11 | 9 |
| 12 – 18 | 10 | 20 |
| 18 – 22 | 8 | 8 |
| >22 | 30 | 9 |

Can you conclude that the theoretical model does not explain the observed values well? (11 marks)

**QUESTION FOUR (20 MARKS)**

(a) Define the terms:

i) Business statistics

ii) Skewness

iii) Time series (6 marks)

(b) From the table below, that the mean number tablets to come fever is 19.9, find the missing frequency.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. of tables | 4-8 | 8-12 | 12-16 | 16-20 | 20-24 | 24-28 | 28-32 | 32-36 | 36-40 |
| No. of persons | 11 | 13 | 16 | 14 | ? | 9 | 17 | 6 | 4 |

(4 marks)

(c) Secretaries in a given office took 15 minutes with a standard deviation at 2 minutes for teas break. When a new employee was observed over 50 such tea brakes, she had an average at 17 minutes should she be cautioned about taking too long a time over her tea break. (8 marks)

(d) How large should be a sample needed to estimate a population mean income to an accuracy at about Kshs.100 to it true value with 95% confidence, given the standard deviation is Shs.1,500. (2 marks)

**QUESTION FIVE (20 MARKS)**

(a) i) Define the term ANOVA. (2 marks)

ii) Explain the circumstances under which an Anova test is preferred over the t-test. (2 marks)

(b) Give the joint density at random variable x and y:

f(x, y) = 

Find P (x > 0.5) and y < 0.5) (6 marks)

(c) Four salesmen were considered in terms of their quarterly sales over one year with the following results.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Salesman | Quarterly sales (million) |  |  |  |
|  | Q1 | Q2 | Q3 |  |
| A | 1.9 | 1.6 | 2.0 | 1.8 |
| B | 1.7 | 1.9 | 1.8 | 1.7 |
| C | 1.2 | 0.9 | 1.2 | 0.9 |
| D | 1.5 | 1.0 | 1.4 | 1.3 |

i) Construct an Anova Table. (8 marks)

ii) Can you conclude that the mean differ for different sales men.(2 marks)