

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

## JOMO KENYATTA UNIVERSITY

**OF AGRICULTURE AND TECHNOLOGY**

**YEAR TWO SEMESTER TWO EXAMINATIONS FOR THE DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY**

**STA 2103: PROBABILITY STATISTICS**

**APRIL 2017 TIME: 2 HOURS**

**ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

a) Define the following terms as used in probability;

i) Random variable

ii) Continuous variable

iii) Discrete variable

iv) Probability mass function

v) Probability density function

vi) Conditional probability (6 marks)

b) John tosses a coin three times;

i) Write down the probability space

ii) What is the probability of John getting at least two heads

iii) What is the probability of John getting at least 2 heads given that the first time the coins shows a head

iv) Find the probability distribution of x, the number of heads observed (6 marks)

c) A random variable x has the following probability distribution;

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X X | 1.5 | 2.0 | 2.5 | 3.0 |
| P(X=X) | 2b | 4b | 3b | b |

Find the values of b and the expected value of x (4 marks)

d) If P/A) = 0.3, P(B)=0.4, P(AnB)=0.4 show that A and B are not independent (4 marks)

e) Give two sources of;

i) Primary data

ii) Secondary data (4 marks)

f) Explain the following terms as used in statistics;

i) Skewness

ii) Kartosis

iii) Correlation

iv) Regression (4 marks)

g) For two events Q and R, P(Q)=, P(R)=and P(QUR)=. Compute

i) P(QnR)

ii) P(Q/R) (2 marks)

**QUESTION TWO (20 MARKS)**

a) Three events E1, E2 and E3 are defined in the same sample space. The events E1 and E3 are mutually exclusive. The events E1 and E2 are independent. Given that P(E1)=, P(E3)=and P(E1uE3)=, find

i) P(E1UE2)

ii) P(E2) (8 marks)

b) The table below shows marks obtained by a sample of 10 students in history and geography exams. Using Spearman’s Ranic correlation coefficient find if there is an association between performance in the two subjects (12 marks)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| History | 9 | 16 | 15 | 21 | 25 | 20 | 15 | 17 | 15 |
| Geography | 11 | 21 | 15 | 25 | 29 | 22 | 18 | 19 | 12 |

**QUESTION THREE (20 MARKS)**

The following table shows the weight in kg of some electronics components manufactured by a company;

28.2 26.2 25.3 27.7 27.2 28.0 29.0 25.6

27.4 26.4 24.7 26.6 26.8 28.3 27.0 28.9

25.9 28.4 26.8 27.9 25.8 27.3 29.3 23.6

25.1 28.7 26.4 26.6 25.8 25.3 24.9 26.3

24.2 25.6 27.3 26.9 27.2 26.7 27.3

a) Define the term frequency distribution (3 marks)

b) Construct a grouped frequencies distribution for the above data using coding method (5 marks)

c) Use the distribution to compute

i) The mode

ii) The mean

iii) The variance

iv) The standard deviation (12 marks)

**QUESTION FOUR (20 MARKS)**

a) Three automobiles plants each produce a certain make of a car. Plant 1 produces 40% of these cars, plant 2 produces 35% and plant 3 produces 25%. It is known that 5% of the cars manufactured in plant 1 have a certain defect, 3% of the cars produced in plant 1 have same defect. 1% of the cars originating in plant 3 have defect. If a car is found to have this defect, what is the probability that the car was manufactured in plant 3 (12 marks)

b) i) Define the terms statistical method (2 marks)

ii) Name four methods of collecting primary data

**QUESTION FIVE (20 MARKS)**

a) Explain the meaning of the following

i) Positive and negative skewness

ii) Ill-mode (6 marks)

b) Timetable below gives monthly wage distribution

Wage (Ksh/month) Number

35-45 15

45-55 23

55-65 42

65-75 52

75-85 76

85-95 107

95-105 220

105-115 82

115-125 14

125-135 2

Using the above figures, calculate the Pearson’s measure of skewness. Comment on your result (14 marks)