

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

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2016/2017**

**FIRST YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY**

**STA 2100: PROBABILITY AND STATISTICS I**

**DATE: NOVEMBER, 2016 TIME: 2 HOURS**

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

 **TWO QUESTIONS**

 **QUESTION ONE: 30 MARKS**

a. Define the following terms and briefly give examples: [6 marks]

i. Naturally exclusive events.

ii. Independent events.

iii. Complimentary events .

b. In a series of 20 spot checks, the following number of passengers were counted at a certain depot:-

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 137 | 136 | 135 | 136 | 135 |
| 135 | 137 | 138 | 136 | 137 |
| 136 | 136 | 138 | 137 | 136 |
| 137 | 136 | 136 | 138 | 135 |

Using this data set, determine,

i. Mean. [3 marks]

ii. Median. [2 marks]

iii. Mode . [1 mark]

c. In a certain school class, consisting of 60 girls and 40 boys, it is observed That 24 girls and 16 boys wear eye glasses. What is the probability That a student picked at random wear eye glasses given That the student is a boy. [3 marks]

d. State any Three methods of data collection. [3 marks]

e. The probability That a contractor will get a plumbing contract is 2/5 and probability of not getting an electric contract is 5/9. If the probability of getting at least one contract is 4/5. What is the probability that he will get both? [4 marks]

f. The odds that A speaks the truth is 3:2 and the odds That B speaks the truth is 5:3. In what percentage of cases are they likely to contradict each other on an identical point? [4 marks]

g. State four characteristic of a good measure of dispersion. [4 marks]

**QUESTION TWO: 20 MARKS**

The following are the number of babies born during a year in 60 community hospitals.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 | 55 | 40 | 58 | 54 | 45 | 49 | 32 | 57 | 47 |
| 37 | 26 | 59 | 46 | 48 | 56 | 59 | 35 | 46 | 24 |
| 32 | 56 | 43 | 56 | 42 | 32 | 57 | 29 | 42 | 42 |
| 39 | 57 | 45 | 54 | 31 | 54 | 53 | 59 | 30 | 53 |
| 52 | 27 | 34 | 53 | 53 | 21 | 34 | 28 | 50 | 22 |
| 55 | 52 | 28 | 49 | 54 | 31 | 24 | 24 | 57 | 29 |

a. Using sturge’s rule, construct a frequency distribution table. [6 marks]

b. Using the table in part (a) above, calculate:-

 i The lower quartile. [3 marks]

 ii. Middle quartile. [3 marks]

 iii. Upper quartile. [3 marks]

 iv. Quartile deviarim. [2 marks]

 v. The 83rd percentile. [3 marks]

 **QUESTION THREE: 20 MARKS**

 The following table shows production units (x) and costs (Y) of a certain

Company:-

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X (‘000) units | 10 | 4 | 6 | 9 | 10 | 8 | 5 | 7 | 11 | 12 |
| Y ($’000) | 15 | 11 | 12 | 19 | 22 | 20 | 16 | 13 | 24 | 20 |

a. Draw a scatter diagram and interpret your diagram. [3 marks]

b. Determine the Pearson correlation coefficient between X and Y and interpret your answer. [6 marks]

c. Determine the coefficient of determination. [3 marks]

d. Fit a simple linear regression model between X and Y. [6 marks]

e. Predict the cost of production for the next one month when output is scheduled to be 10,000 units. [2 marks]

**QUESTION FOUR: 20 MARKS**

The following table shows the age distribution of cases of a certain disease reported during a year in a particular county.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Age | 5-14 | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 |
| No. of cases | 8 | 10 | 20 | 22 | 13 | 7 |

Using the above data, compute:-

a. The mean. [4 marks]

b. Median. [3 marks]

c. Mode. [3 marks]

d. Standard deviation. [5 marks]

e. coefficient of variation. [2 marks]

f. Pearson skewness coefficient [3 marks]

**QUESTION FIVE: 20 MARKS**

a. In a doctor’s waiting room, there are ten patients, 4 women and 6 men. The doctor is capable of seeing only three patients at random one after the other. Using a probability tree diagram show the possibility space. [5 marks]

Find the probability that:-

 i. The three seen were all men. [2 marks]

 ii. There was at least a woman. [2 marks]

 iii. There were two men and a woman. [3 marks]

b. Two computers A and B are being marketed by a salesman whose chances of finding customers for them are 60% and 40% respectively. The computers can be sold independently. Given that at least one computer was sold, what is the probability that it was A? [8 marks]