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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2019/2020 ACADEMIC YEAR ONE**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF SCHOOL OF PURE AND APPLIED SCIENCES**

**FOR THE DEGREE OF BACHELOR OF EDUCATION**

**COURSE CODE: STA 205**

**COURSE TITLE:**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 15/12/2020 TIME: 03.00-05.00 PM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of FOUR (4) printed pages *please turn over***

**QUESTION ONE**

1. Define the term statistics hence explain how statistical procedure can be considered both a descriptive and inferential statistics in hotel management **(3 marks)**
2. A gambler has a biased coin for which the probability of a head is 0.55. He tosses the coin 8 times. What is the probability of him getting 6 heads? **(4 marks)**
3. Distinguish between
4. Census and sampling
5. Sampling unit and sampling frame **(4 marks)**
6. The table below shows a frequency distribution on marks of a final examination by masters students

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 |
| No. of students | 1 | 3 | 11 | 21 | 43 | 32 | 9 |

Use the given data to compute the following

1. Mean
2. Mode
3. Median
4. Standard deviation **(5 marks)**
5. Calculate the sample size needed to estimate the population average to within 0.50 when the confidence is 90% and population variance is 25 **(3 marks)**
6. The discrete random variable X has the probability distribution shown below. Determine Var(X) and E(X) **(5 marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 |
| P(X=x) | 0.2 | 0.1 | 0.3 | 0.4 |

1. The frequency distribution shows the number of pounds of each snack eaten during the super bowl. Construct a pie and a bar chart for the data **(6 marks)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Snacks | Potato chips | Tortilla chips | Pretzels | Popcorn | Snack nuts |
| Pounds in millions | 11.2 | 8.2 | 4.3 | 3.8 | 2.5 |

**QUESTION TWO**

1. Differentiate between regression Analysis and correlation Analysis **(4 marks)**
2. The data below show marks in a mathematics and physics examination. Calculate the Pearson’s coefficient of correlation from the data.  **(4 marks)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Mathematics: $x$ | 48 | 35 | 17 | 23 | 47 |
| Physics: $y$ | 45 | 20 | 40 | 25 | 45 |

1. Estimate a and b in the regression line of the form y= a +bX **(4 marks)**
2. Estimate the value of Y when X=50 **(2 marks)**
3. Three girls, Aileen, Barbara and Cathy, pack biscuits in a factory. From the batch allocated to them, Aileen packs 55%, Barbara 30% and Cathy 15%. The probability that Aileen breaks some biscuits in a packet is 0.7 and the respective probabilities for Barbara and Cathy are 0.2 and 0.1. What is the probability that a packet with broken biscuits found by a checker was packed by Aileen? (6 marks)

**QUESTION THREE**

1. $\left(A\right)= \frac{1}{3}$, $P\left(B\right)= \frac{1}{4}$, and $P(A/B$) $= \frac{2}{5}$. Find
2. $P(B/A$) **(3 marks)**
3. $P(A ∩B)$  **(3 marks)**
4. Two events $A$ and $B$ are such that $P\left(A\right)= \frac{1}{4}$, $P(A/B$) = $\frac{1}{2}$, and $P(B/A$) = $\frac{2}{3}$. Find
5. $P(A ∩B)$ **(1 mark)**
6. $P(B)$ **(2 marks)**
7. Are $A$ and $B$ mutually exclusive **(2 marks)**
8. In a sample of 100 household in Laikipia County, the following distribution of number of people per household was observed.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. of people  | X | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| No. of household  | F | 7 | f2 | 20 | f4 | 18 | 10 | 5 |

The mean of people of per household frequencies was found to be 4.0. However, the frequencies per two and four members per household are missing.

1. Calculate the missing frequencies f2 and f4 **(9 marks)**

**QUESTION FOUR**

1. Explain the types of variable used in statistics hence given two sources of data collection citing examples **(6 marks)**
2. The table below shows a frequency distribution on marks of a final examination by bachelor students

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 3.50-3.59 | 3.60-3.69 | 3.70-3.79 | 3.80-3.89 | 3.90-3.99 | 4.00-4.09 | 4.10-4.19 | 4.20-4.29 |
| No. of students | 1 | 2 | 2 | 4 | 5 | 6 | 3 | 2 |

Use the given data to compute the following **(14 marks)**

i) Compute the sample mean and sample standard deviation.

ii) Compute the median and mode

iii) Construct a relative frequency histogram and ogive curve of the data.

**QUESTION FIVE**

1. A discrete random variable Y has a probability mass function given by the table below

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Y | 0 | 1 | 2 | 3 | 4 |
| P(Y=y) | C | 2c | 5c | 10c | 17c |

 Find the value of the constant c and hence compute P (1≤Y<3) **(6 marks)**

1. The data given below are obtained from student records. Calculate the rank correlation R for the data

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 8.3 | 8.6 | 9.2 | 9.8 | 8.0 | 7.8 | 9.4 | 9.0 | 7.2 | 8.6 |
| Y | 2300 | 2250 | 2380 | 2400 | 2000 | 2100 | 2360 | 2350 | 2000 | 2260 |

1. marks)
2. The following are the yearly percentage losses made by a company in 10 successive years

 22, 89, 36, 17, 22, 17, 27, 12, 14, 15.

 Find the arithmetic mean, harmonic mean and geometric mean. **(6 marks)**