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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2020/2021 ACADEMIC YEAR THREE**

**THIRD SEMESTER EXAMINATION**

**SCHOOL OF BUSINESS AND ECONOMICS**

**FOR THE DEGREE OF BACHELOR OF BUSINESS MANAGEMENT**

**COURSE CODE: BBM 350**

**COURSE TITLE: MANAGERIAL STATISTICS**

**EXAMINATION DURATION: 3 HOURS**

**DATE: TIME:**

**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**

**QUESTION ONE (COMPULSORY)**

1. Define the following terms
2. Hypothesis
3. Level of significance
4. Degrees of freedom
5. Unbiased Estimator
6. Sampling distribution **[5 marks]**
7. On experience, it is found that Mr. Chege is late for lectures on four days of 30 working days. Let X denote the number of times Mr. Chege will be late for lectures in the next 60 working days. Determine P(5< X< 10) **[5 marks]**
8. Distinguish between
9. Type I error and Type II error
10. Point Estimate and Interval Estimate **[4 marks]**
11. Calculate the sample size needed to estimate the population average to within 0.50 when the confidence is 90% and population variance is 25 [**5 marks]**
12. You take a random sample of 25 students from a statistics class and find that only 5 understand the lecture. With 99% confidence, estimate the proportion of all students who understand the lecture? **[5 marks]**
13. The standard deviation of the life for a particular brand of light bulb is known to be 400 hrs and the operating life of the tubes is normally distributed. The manufacturer claims that the average tube life is at least 8500 hrs. Test this claim at 5% level of significance against the alternative hypothesis that mean life is less than 8500hrs, given the fact that for a sample size of 20 tubes, the mean operating life was hrs **[6 marks]**

**QUESTION TWO (20 Marks)**

1. In a study of the television viewing habits of children, a development psychologist selects a random sample of 300 first graders- 100 boys and 200 girls. Each child is asked which of the following TV programs they like best Citizen, KTN and NTV. Results are shown in the contingency table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Viewing Preferences | | | | |
|  | KTN | CITIZEN | NTV | Row Total |
| Boys | 50 | 30 | 20 | 100 |
| Girls | 50 | 80 | 70 | 200 |
| Columns | 100 | 110 | 90 | 300 |

Do boys preference for the TV programs differ significantly from the girls preferences? Use 0.05 level of significance. [12 Marks]

1. The amount of time required at a customer care desk has been found to be approximately normally distributed with mean of 3 minutes and a variance of 2500 square seconds. What is the Probability that a randomly selected customer will:
2. Spend more than 7 minutes
3. Spend between 1 minute and 3 minutes
4. Take more than 150 seconds at the desk **[8 marks]**

**QUESTION THREE (20 Marks)**

1. The following table gives the sample data from a survey on income of managing directors of the sampled companies in both Kenya and Tanzania

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Country | Income (in Euros) | | | | | | | | | |
| Kenya | 5000 | 4680 | 4500 | 3200 | 6845 | 6500 | 6065 | 5147 | 4365 | 3933 |
| Tanzania | 3540 | 6500 | 2700 | 3200 | 2760 | 6245 | 5544 | 5498 | 4367 |  |

1. Test whether the mean income for each country is above 4000 Euros at 5% level of significance **[8 marks]**
2. Test whether the variation for the two countries was the same or not at 5% level of significance. **[6 marks]**
3. Below is a sample of earnings (in thousands of shillings) of fast food outlets in Garissa in a month: 45, 38, 30, 37, 54, 49, 65, 40, 33, 28, 36, 48, 53 and 55
4. Estimate the average earning of a fast food outlet in Garissa **[2 marks]**
5. Determine the 95% confidence interval of a food outlet in Garissa in a month **[4 marks]**

**QUESTION FOUR (20 Marks)**

a) Explain how ANOVA differs from t-test. **[2 Marks]**

b) A company sells identical soaps in three different wrappings at the same price. The sales for 5 months are given in the table below. Sales data are normally distributed with equal variance. Test at 5% level of significance whether the mean soap sales for each wrapping is equal or not  **[18 marks]**

|  |  |  |
| --- | --- | --- |
| Wrapping 1 | Wrapping 2 | Wrapping 3 |
| 87 | 78 | 90 |
| 83 | 81 | 91 |
| 79 | 79 | 84 |
| 81 | 82 | 82 |
| 80 | 80 | 88 |

**QUESTION FIVE (20 Marks)**

1. For large population of normally distributed account balance, the mean balance is Ksh. 15000 with standard deviation of Ksh 3500. What is the probability that a randomly selected account has a balance that
2. Exceed Kshs. 16000
3. Lies between Kshs. 13000 and Kshs. 20000
4. Is less than Kshs. 17000 **[8 Marks]**
5. Past experience shows that 1% of the lightbulbs produced in a plant are defective. Find the probability that more than one bulb is defective in a random sample of 30 bulbs, using
6. Binomial distribution
7. Poisson distribution **[6 Marks]**
8. Two random sample were drawn from two normal populations and their values are

A: 364, 366, 374, 378, 382, 385, 387, 392, 393, 395, 397 **[6 marks]**

B: 366, 367, 375, 376, 382, 384, 388, 390, 392

Test whether the two population have the same variance at 5% level of significant?