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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2017/2018 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: 06/08/18 TIME: 09.00-12.00 PM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other THREE (3) 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 FIVE (5) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Define the following terms
2. Hypothesis
3. Level of significant
4. Degrees of freedom **[3 marks]**
5. On experience, it is found that Mr. Omondi is late for lecturers on four days of 30 working days. Let X denotes the number of times Mr. Omondi will be late for lecturers in the next 60 working days. Determine P(5< X< 10) **[5 marks]**
6. Distinguish between
7. Type I error and Type II error
8. Sampling distribution and statistic **[4 marks]**
9. 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]**
10. The discrete random variable X has the probability distribution shown below if P (X≤1) = 0.3 and E(X) =1.7. Determine Var (X) **[4 marks]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 |
| P(X=x) | 0.2 | a | b | c |

1. The standard deviation of the life for a particular brand of light bulb is known to be 400hrs and the operating life of the tubes is normally distributed. The manufacturer claims that the average tube life is at least 9100 hrs. Test this claim at 5% level of significance against the alternative hypothesis that mean life is less than 9100 hrs, given the fact that for a sample size of 20 tubes, the mean operating life was 8800hrs **[6 marks]**

**QUESTION TWO**

1. The table below shows the marks of two students in two subjects X and Y in TUK.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Subject X | 65 | 78 | 59 | 43 | 36 | 56 | 43 |
| Subject Y | 36 | 39 | 27 | 28 | 24 | 20 | 25 |

1. Fit a Linear regression to the above data by determining a and b in the equation Y= a + bx
2. Predict the Y for X=50 **[7 marks]**
3. 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 customers will:
4. Spend more than 7 minutes
5. Take more than 150 seconds at the desk
6. Spend between 1 minute and 3 minutes **[8 marks]**

**QUESTION THREE**

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 **[10 marks]**
2. Construct the 95% confidence level for the mean income of Kenya **[5 marks]**

**QUESTION FOUR**

A company sells identical soaps in three different wrappings at the same price. The sales for 5months 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  **[15 marks]**

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

**QUESTION FIVE**

1. For large population of normally distributed account balance, the mean balance is u=15000 Kshs with standard deviation 3500. What is the probability that a randomly account has a balance that
2. Exceed 16000 Kshs
3. Lies between 13000 Kshs and 20000 Kshs
4. Is less than 17000 Kshs **[7 marks]**
5. An operating manager is interested in buying new office software that reduces the time required to carry out some office task. In order to compare the performance of the new software to that of the new software to that of the old one, she randomly selected 36 individuals and have them perform a standard set of tasks, using the new software, typical of those encountered in the office. Of course, in carrying out the comparison the manager was careful to use individuals who did not have an established performance or skill with either type of software. The time the individuals took to perform the standard set of tasks, to the nearest minute, is reported in table below.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time | | | | | | | | | | | |
| 12 | 16 | 15 | 13 | 16 | 10 | 15 | 17 | 14 | 12 | 15 | 13 |
| 10 | 17 | 18 | 16 | 19 | 12 | 17 | 15 | 17 | 14 | 16 | 10 |
| 15 | 18 | 15 | 14 | 20 | 16 | 14 | 11 | 16 | 13 | 10 | 12 |

Given that the old software required, on average, 13.5 minutes to perform a similar standard set of tasks, is there enough evidence to compel the manager to buy the new software at 10% level of significance? **[8 marks]**

**QUESTION SIX**

Below is a sample of earnings ( in thousands of shillings) of fast food outlets in Kangemi in a month: 45, 38, 30, 37, 54, 49, 65, 40, 33, 28, 36, 48, 53 and 55

1. Estimate the average earning of a fast food outlets in Kangemi **[2 marks]**
2. Determine the 95% confidence interval of a food outlet in Kangemi in a month **[4 marks]**
3. 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 |

1. Do boys preference for the TV programs differ significantly from the girls preferences? Use 0.05 level of significant **[9 marks]**