**Ramaiah Institute of Technology**

(Autonomous Institute, Affiliated to VTU)

**Programme: B E – Common to all branches**

**Term: 3/10/2024 – 25/01/2025**

**Course:** **Research Methodology and Intellectual Property Rights**

**Course Code:AL58 CIE:** 5 marks test component **Sem: V Max Marks:** 5 **Date:**\_\_\_\_\_\_\_\_\_\_\_ **Time:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Instructions to Candidates:** Answer all the questions.

**Portions for test:** Unit III

Question Bank

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| **Sl No.** | **Question** | **BL** | **CO** |
| **1** | Ten individuals are chosen at random from a normal distribution and their weights are found to be 62, 63, 66, 67, 68, 69, 70, 71 and 70. Discuss the suggestion that this mean weight of the population is 66kg. (Assume 5% level of significance) | **4** | **3** |
| **2** | A random sample of 300 electronic components manufactured by a certain process is tested, and 25 are found to be defective. Let p represent the proportion of components manufactured by this process that are defective. The process engineer claims that p ≤ 0.05. Does the sample provide enough evidence to reject the claim? | **4** | **3** |
| **3** | For a sample of 60 women taken from a population of over 5000 enrolled in a weight reducing program at a nationwide chain of health program, the mean diastolic blood pressure is 101 and the sample standard deviation is 42. At a significance level of 0.02 on average, did the women enrolled in the program have diastolic pressure that exceeds the value of 75? | **4** | **3** |
| **4** | Suppose we would like to determine if the typical amount spent per customer for dinner at a new restaurant in town is more than $20.00. A sample of 49 customers over a three-week period was randomly selected and the average amount spent was $22.60. Assume that the population standard deviation is known to be $2.50. Using 0.02 level of significance, would we conclude the typical amount spent per customer is more than $20.00? | **4** | **3** |
| **5** | Suppose, according to a 1990 demographic report, the average U. S. household spends $90 per day. Suppose you recently took a random sample of 30 households in Huntsville and the results revealed a mean of $84.50. Suppose the standard deviation (population)is known to be $14.50. Using a 0.05 level of significance, can it be concluded that the average amount spent per day by U.S. households has decreased? | **4** | **3** |
| **6** | Historically, evening long-distance calls from a particular city have averaged 15.2 minutes per call. In a random sample of 35 calls, the sample mean time was 14.3 minutes. Assume the standard deviation is known to be 5 minutes. Using a 0.05 level of significance, is there sufficient evidence to conclude that the average evening long-distance call has decreased? | **4** | **3** |
| **7** | The marketing manager for an automobile manufacturer is interested in determining the proportion of new compact-car owners who would have purchased a passenger-side inflatable air bag if it had been available for an additional cost of $300.   The manager believes from previous information that the proportion is 0.30.   Suppose that a survey of 200 new compact-car owners is selected and 79 indicate that they would have purchased the air bags.   At the 0.10 level of significance, is there enough evidence that the population proportion is different from 0.30? | **4** | **3** |
| **8** | A forester wants to control a dense understory of striped maple that is interfering with desirable hardwood regeneration using a mist blower to apply an herbicide treatment. She wants to make sure that treatment has a consistent application rate, in other words, low variability not exceeding 0.25 gal./acre (0.06 gal2). She collects sample data (n = 11) on this type of mist blower and gets a sample variance of 0.064 gal2. Using a 5% level of significance, test the claim that the variance is significantly greater than 0.06 gal. | **4** | **3** |
| **9** | With individual lines at its various windows, a post office finds that the standard deviation for normally distributed waiting times for customers on Friday afternoon is 7.2 minutes. The post office experiments with a single, main waiting line and finds that for a random sample of 25 customers, the waiting times for customers have a standard deviation of 3.5 minutes.  With a significance level of 5%, test the claim that a single line causes lower variation among waiting times (shorter waiting times) for customers. | **4** | **3** |
| **10** | A scuba instructor wants to record the collective depths each of his students dives during their checkout.  He is interested in how the depths vary, even though everyone should have been at the same depth.  He believes the standard deviation of the depths is 1.2 meters.  But his assistant thinks the standard deviation is less than 1.2 meters.  The instructor wants to test this claim.  The scuba instructor uses his most recent class of 20 students as a sample and finds that the standard deviation of the depths is 0.85 meters.  At the 1% significance level, test if the variability in the depths of the student scuba divers is less than claimed. | **4** | **3** |

Mobile phones are not permitted