**Consider the following statement for questions 1-5**

It is given that  for the expenses of books and supplies for the students of a certain large university for a semester. To estimate the mean of such expenses for all the students, a simple random sample of 35 students is taken and the mean for these 35 students is .

1. What is the margin of error of your estimate of the population mean at a 95% confidence level?
2. Construct a 95% confidence interval for the mean such expenses for all the students.
3. What is the margin of error of your estimate of the population mean at a 99% confidence level?
4. Construct a 99% confidence interval for the mean such expenses for all the students.
5. Which of the two confidence interval is wider?

**Consider the following for the questions 6-9**

We have to construct a confidence interval for the mean of SAT (verbal and quantitative) scores of students who use a special coaching. How large a sample must be taken to participate in the coaching group to estimate this mean with a margin of error of no more than 25 points if we can assume that the population standard deviation is 175 points for the reference population?

Compute the required sample size for each of the following confidence levels.

1. 90% confidence
2. 95% confidence
3. 99% confidence

**Consider the following for the questions 10-12**

A clinic claims that the average time taken by a patient to see the doctor from the appointment time

is 30 minutes. A simple random sample of 35 patients is contacted the mean of the wait time for this sample is 47 minutes and the standard deviation of the wait time for this sample is 12 minutes.

1. What is the margin of error of your estimate of the population mean at a 95% confidence level?
2. Construct a 95% confidence interval for the mean wait time for all the patients.
3. Is 30 minute in this interval?

**Consider the following for the questions 13-15**

In a simple random sample of 821 citizens, 63% said that they approve the tax raise for improving the infra-structure of the nation.

1. What is the margin of error of your estimate of the population proportion at a 95% confidence level?
2. Construct a 95% confidence interval for the proportion of all the people who approve the tax raise for improving the infra-structure of the nation.
3. How large a sample should be taken to estimate this proportion with 95% confidence with a margin of error of no more than 2% points.

**Use the following for the questions 16-18**

The mean weight of the adults in a certain region is believed to be . An agency thinks that this

mean may be higher than the above belief. They are going to take a simple random sample of 100 adults for a hypothesis test at 5% level of significance.

1. State the null and the alternate hypothesis for this test.
2. If the mean weight of the adults in the above simple random sample is  and we know that the population standard deviation is , compute the test statistic and the P\_value of the test.
3. Will you reject or not reject the null hypothesis at 5% level of significance?

**Use the following for questions 19-22**

An expensive medication from a particular company states 100 ml for the contents on the bottles for this medication. An agency would like to test if the bottles are being under filled, in the sense that the mean contents of all bottles is less than 100 ml.

1. State the null hypothesis and the alternative hypothesis.
2. The contents in 10 randomly selected bottles were measured, and the results are below in ml.

contents in ml

96.0 102.0 99.4 100.5 97.5 98.7 103.4 97.6 98.5 99.4

**Variable N N\* Mean SE Mean StDev Minimum Q1 Median Q3**

**contents 10 0 99.300 0.696 2.201 96.000 97.575 99.050 100.875**

**Variable Maximum**

contents 103.400

**State the test statistic**

1. State the P\_value.
2. Does this sample show a good evidence at 5% level of significance that the bottles are being under filled?

**Use the following for the questions 23-28**

The electricity supply in a certain region appears to show a lot of voltage fluctuation from the required value of 240 V.

To check if the mean voltage is different from 240 V, the voltage will be measured at 15 randomly selected times.

1. State the null and the alternative hypothesis for this test.
2. The following are the readings shown by the 15 measurements.

voltage

 222.2 217.9 211.9 219.7 208.8 229.5 219.4 208.1 209.0 208.2 196.2 211.7 199.9 201.1 218.0

**Variable N N\* Mean SE Mean StDev Minimum Q1 Median Q3**

**voltage 15 0 212.11 2.35 9.10 196.20 208.10 211.70 219.40**

**Variable Maximum**

**voltage 229.50**

**Write the test statistic**.

1. Will you reject or not reject the null hypothesis at 5% level of significance?
2. Compute a 95% confidence interval for the overall mean voltage based on the results from the above sample.
3. Does this interval contain the value 240 Volt?
4. Explain the usage of a 95% confidence interval for a two sided hypothesis test for a population mean at a 5% level of significance.

**Use the following for the questions 29-30**

In the past, 44% of those taking a public accounting qualifying exam have passed the exam on their first try. Lately, the availability of exam preparation books and tutoring sessions may have improved the likelihood of an individual’s passing on his or her first try. To test if the likelihood of passing in the first try in now higher,

a simple random sample of recent applicants will be examined.

1. State the null hypothesis and the alternative hypothesis
2. In a sample of 250 recent applicants, 130 passed on their first attempt. At 0.05 level of significance, can we conclude that the proportion passing on the first try has increased? State the P\_value and a reason for your conclusion.