

Silchar campus) students and find that 61 are female, which is a sample proportion of $61 / 100 \approx 0.61$. So, 61.0% of the students in the sample are female.

What can they conclude about the proportion of females at the AUS? How confident can they be in their estimate? What is the confidence interval?
3+3+2

- (b) What do you mean by margin of error? 2
8. (a) Write down the differences between one-way and two-way ANOVA. 2
- (b) A college administrator claims that there is no difference in first-year grade point averages for students entering the college from any of three different city high schools. The following data give the first-year grade point averages of 12 randomly chosen students, 4 from each of the three high schools. At the 5 percent level of significance, do these data disprove the claim of the administrator? 8

School 1	School 2	School 3
3.2	3.4	2.8
3.4	3.0	2.6
3.3	3.7	3.0
3.5	3.3	2.7

B. Tech Odd Semester Examination, February, 2023

Agricultural Engineering (5th Semester)

Course No.: CSEEL-33
(Engineering Statistics)

Full Marks: 50
Pass Marks: 15

Time: 2 hours

- Note:**
- Attempt any five questions.
 - Begin each answer in a new page.
 - Answer parts of a question at a place.
 - Assume reasonable data wherever required.
 - The figures in the right margin indicate full marks for the question.
 - All the mathematical symbols and abbreviations have their usual meanings.
- Is sampling with replacement a purely random strategy? Justify your answer. 1+1
 - What is the difference between standard deviation and standard error? 2
 - Suppose, we are interested in finding a 95% confidence interval for the mean score of batsmen in season of IPL. Ten cricketers are randomly sampled, and their scores are 20, 560, 500, 254, 470, 660, 60, 180, 390 and 640. What is the standard error of the sample mean? 2
 - Is sample standard deviation a good estimator for the population standard deviation? Justify your answer using a suitable example. 4
 - What is degree of freedom? 1
 - What is student's 'T'? 2

Turn Over

- (c) A public health official claims that the mean home water use is 350 gallons a day. To verify this claim, a study of 20 randomly selected homes was instigated with the result that the average daily water uses of these 20 homes were as follows:

340 344 362 375
 356 386 354 364
 332 402 340 355
 362 322 372 324
 318 360 338 370

Do the data contradict the official's claim? 7

3. (a) Why we should consider the alternative hypothesis? When a sample is treated as large sample? 1+1
- (b) What is the main difference between null and alternative hypothesis? 2
- (c) When a sample is treated as large sample? Why we should consider the alternative hypothesis? 2
- (d) The fraction of defective items in a large lot is 'P'. To test the null hypothesis $H_0: P=0.2$, one consider the number 'f' of defectives in a sample of 8 items and accept the hypothesis if $f < 6$, and reject the hypothesis otherwise. What is the probability of type-1 error of the test? What is the probability of type-2 error of the test? 2+2
4. (a) When inferential statistic is applicable? 2
- (b) Does your bank balance is an example of anominal data? Briefly explain your answer. 2
- (c) Why probability model is important in statistic? 2

- (d) Briefly explain the different types of probability sampling methods. 4

5. (a) What are the estimation criteria of a goodpoint estimator? 3
- (b) Why correction factor is required? 2
- (c) Show that the sample mean based on a simple random sample with replacement (srswr) is an unbiased estimator of the population mean. 5
6. (a) What is regression? 2
- (b) The corrosion of a certain metallic substance has been studied in dry oxygen at 500 degrees Centigrade. In this experiment, the gain in weight after various periods of exposure was used as a measure of the amount of oxygen that had reacted with the sample. Here are the data:

Hours	Percent Gain	Hours	Percent Gain
1.0	0.02	1.0	0.02
2.0	0.03	2.0	0.03
2.5	0.035	2.5	0.035
3	0.042	3	0.042
3.5	0.05	3.5	0.05
4	0.054	4	0.054

Plot a scatter diagram.

Fit a linear relation.

Predict the percent weight gain when the metal is exposed for 3.2 hours. 2+3+3

7. (a) According to a 2020 report from the NAAC, females make up 57% of the university population in India. Students in a statistics class at our department want to determine the proportion of female students at Assam University. They select a random sample of 100 AUS (Assam University