Introduction to Statistical Methods
(S1-23_AIMLCZC418) – Assignment 2
AIML Section- 1

Each question carries 02 Marks (2.5 x 4 = 10 Marks)
Duration: 23rd February 2024 – 10th March 2024

1) Submissions are individual
2) Solve these on paper, scan, and upload
3) Plagiarism results in zero marks
4) Write your name, BITS ID and Section on each page.

Questions:

1. Based on their total scores, 200 candidates of civil service examination are divided into two groups, the upper 30% and the remaining 70%. The first question of the examination is considered as a sample. Among the first group, 40 had the correct answer, whereas among the second group, 80 had the correct answer. Based on these results, can one conclude that the first question is not good at discriminating the ability of the students being examined here? (Take $\alpha = 0.05$)

2. An experiment was performed to compare the abrasive wear of two different laminated materials. Twelve pieces of material 1 were tested by exposing each piece to a machine measuring wear. Ten pieces of material 2 were similarly tested. In each case, the depth of wear was observed. The samples of material 1 gave an average (coded) wear of 85 units with a sample standard deviation of 4, while the samples of material 2 gave an average of 81 with a sample standard deviation of 5. Can we conclude at 0.05 level of significance that the abrasive wear of material 1 exceeds that of material 2 by more than 2 units? Assume the populations to be approximately normal with equal variances.

3. A sample analysis of examination results of 500 students was made. It was found that 220 students had failed, 170 had secured a third class, 90 were placed in second class and 20 got a first class. Do these figures commensurate with the general examination result which is in ratio of 4:3:2:1 for the various categories respectively? Test at 5% Level of Significance.

4. The following are the numbers of mistakes made in 5 successive days for 4 technicians working for a photographic laboratory:

Technician I	Technician II	Technician III	Technician IV
5	17	9	9
12	12	11	13
9	15	6	7
8	14	14	10
11	17	10	11

Test at the level of significance $\alpha = 0.01$ whether the differences among the 4-sample means can be attributed to chance.