# Tribhuvan University
## Faculty of Humanities & Social Sciences
### OFFICE OF THE DEAN
### 2024

**Bachelor in Computer Applications**
**Course Title: Probability and Statistics**
**Code No: CAST 202**
**Semester: III**

**Full Marks: 60**
**Pass Marks: 24**
**Time: 3 hours**

Candidates are required to answer the questions in their own words as far as possible.

### Group B

**Attempt any SIX questions.** [6×5 = 30]

2. Describe the scope and limitations of Statistics.

3. What do you mean by statistics? The following table represents the marks of Probability and Statistics of 100 students.

| Marks | 0 – 20 | 20 – 40 | 40 – 60 | 60 – 80 | 80 – 100 |
|---|---|---|---|---|---|
| No. of students | 12 | 16 | 35 | 24 | 13 |

Find the mean, median and standard deviation of all 100 students.

4. Define correlation. From the following data on marks of 10 students in the two subjects, calculate the Karl Pearson's coefficient of correlation and interpret the result:

| Maths | 55 | 70 | 40 | 30 | 90 | 80 | 60 | 80 | 90 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|
| Basic Statistics | 65 | 40 | 30 | 50 | 60 | 70 | 50 | 50 | 60 | 70 |

5. Define regression. The following table gives the age of the computers of a certain company and annual maintenance costs:

| Age of computers (years) | 2 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|---|
| Maintenance costs(Rs.00) | 10 | 15 | 22 | 32 | 46 |

   i. Obtain the regression equation for cost related to age.

   ii. Estimate the cost of maintenance for 10 yrs old computer.

   iii. Interpret the slope.

6. Define Poisson distribution. In certain factory timing out optical lenses, there is a small chance, 1/500 for any lens to be defective. The lenses are supplied in a packet of 10 each. What is the probability that apacket will contain; (i) No defective lens, (ii) At least one defective lenses, and, (iii) At most two defective lenses.

7. A dean of a college wants to use the mean of a random sample to estimate the average amount of time students take to get from one class to the next, and she wants to be able to assert with 95% confidence that error is at most 0.25 minute. If it can be presumed from experience that $\sigma = 1.40$ minutes, how large a sample will she have to take?

8. Define sampling. A population consists of the four numbers 2,8,14 and 20. (i) Write down all possible sample size of two without replacement. (ii) Verify that the sample mean is an unbiased estimate of population mean.

## Group C

**Attempt any TWO questions.**                                    [2×10 = 20]

9. Two computer manufacturers A and B compete for profitable and prestigious contract. In their rivalry, each claim that their computer a consistent. For this it was decided to start execution of the same program simultaneously on 50 computers of each company and recorded the time as given below.

| Time (in second) | 0 – 2 | 2 – 4 | 4 – 6 | 6 – 8 | 8 – 10 | 10 – 12 |
|---|---|---|---|---|---|---|
| No. of computers manufactured by A | 5 | 16 | 13 | 7 | 5 | 4 |
| No. of computers manufactured by A | 2 | 7 | 12 | 19 | 9 | 1 |

Compute mean and standard deviation of each company's computers. Also, compute which company's computer is more consistent.

10. Define normal distribution and Standard normal distribution. The life time of a certain electronic component in a normal distribution with mean 5000 hours and a standard deviation of 1000 hours, compute the probabilities under the following conditions: (a) Life time of components is less than 5012 hours, (b) Lifetime of components between 4000 to 6000 hours, and, (c) Lifetime of components more than 7000 hours.

11. Write the properties of design of experiment. The lifetime in hours of samples from three different brands of batteries were recorded with the following results:

| Brand A | 40 | 30 | 50 | 50 | 30 | |
|---|---|---|---|---|---|---|
| Brand B | 60 | 40 | 55 | 65 | | |
| Brand C | 60 | 50 | 70 | 65 | 75 | 40 |

Construct one-way ANOVA table and test whether the three brands have different average life time.