Roll No | | | | | | | | | | | |

**PRESIDENCY UNIVERSITY**
**BENGALURU**

## SCHOOL OF ENGINEERING

### MAKE UP EXAMINATION – JAN 2023

**Course Code**: MAT1003

**Course Name**: Applied Statistics

**Program**: B.Tech

**Date**: 30 – JAN - 2023

**Time**: 09:30 AM – 12:30 PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**
   *(i)   Read all the questions carefully and answer accordingly.*
   *(ii)  Question paper consists of 3 parts.*
   *(iii) Scientific and non-programmable calculators are permitted.*

## Part A [Memory Recall Questions]

**Answer all the questions. Each question carries TWO marks.**          **(10Q x 2M = 20M)**

1. State the formula for computation of arithmetic mean for unclassified data.
   (C.O.No.1) [Knowledge]

2. Consider the marks of 15 students as follows: 9,9,8,6,4,0,1,2,6,7,8,9,10,0,2. Calculate the mean marks.          (C.O.No.1) [Knowledge]

3. State the formula for computation of the Karl-Pearson correlation coefficient.
   (C.O.No.1) [Knowledge]

4. Write down the formula for the regression equation of $x$ on $y$.          (C.O.No.1) [Knowledge]

5. What is the probability of an impossible event?          (C.O.No.2) [Knowledge]

6. State the addition law of probability.          (C.O.No.2) [Knowledge]

7. Define a discrete random variable.          (C.O.No.3) [Knowledge]

8. Write down the probability mass function for a random variable following Binomial distribution.          (C.O.No.3) [Knowledge]

9. State any two properties of the Normal distribution.          (C.O.No.3) [Knowledge]

10. Define the term "sample".          (C.O.No.4) [Knowledge]

## Part B [Thought Provoking Questions]

**Answer all the questions. Each question carries TEN marks.** **(5Q x 10M = 50M)**

11. Following are the marks obtained by a student A in 10 tests of 100 marks each.

| Test | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Marks obtained by A | 44 | 80 | 76 | 48 | 52 | 72 | 68 | 56 | 60 | 54 |

   Calculate standard deviation for the given data set.     (C.O.No.1) [Comprehension]

12. Calculate the Karl-Pearson's correlation co-efficient for the following data:

| X | 60 | 34 | 40 | 50 | 45 | 41 | 22 | 43 | 42 | 66 | 64 | 46 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y | 75 | 32 | 35 | 40 | 45 | 33 | 12 | 30 | 36 | 72 | 41 | 57 |

                                                        (C.O.No.1) [Comprehension]

13. Three coins are tossed. What is the probability of getting
      (i)   all heads
      (ii)  two heads
      (iii) at least one head
      (iv)  at least two heads                          (C.O.No.2)[Comprehension]

14. The average monthly sales of 'Reliable Computers' are 2500 units with a standard deviation of 100 units. The sales are found to be normally distributed over months. What are the chances that the sales during a particular month will be at most 2400 units.

   (Given that $P(Z \leq 1) = 0.8413$).                 (C.O.No.3) [Comprehension]

15. Define the following:
      (i)   Population
      (ii)  Sampling
      (iii) Parameter
      (iv)  Statistic
      (v)   Alternate Hypothesis                        (C.O.No.4) [Comprehension]


## Part C [Problem Solving Questions]

**Answer all the questions. Each question carries FIFTEEN marks.** **(2Q x 15M = 30M)**

16. Calculate the regression equation of $X$ on $Y$ from the following data:

| $X$ | 10 | 25 | 13 | 25 | 22 | 11 | 12 | 25 | 21 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|
| $Y$ | 12 | 22 | 16 | 15 | 18 | 18 | 17 | 23 | 24 | 17 |

                                                        (C.O.No.1) [Comprehension]

17. Assuming that it is true that 2 in 10 industrial accidents are due to fatigue, using Binomial distribution, find the probability that out of 8 industrial accidents:
      (i)   exactly 2 accidents will be due to fatigue.
      (ii)  all the 8 industrial accidents will be due to fatigue.
      (iii) none of the 8 industrial accidents will be due to fatigue
                                                        (C.O.No.3) [Comprehension]