REG.NO.:

VIT

Vellore Institute of Technology

SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2024-2025

SLOT: G1+TG1

Programme Name & Branch	**: B.Tech**
Course Code and Course Name	**: BMAT202L & Probability and Statistics**
Faculty Name(s)	**: Common slot Question paper**
Class Number(s)	**: Common slot Question paper**
Date of Examination	**: 22/03/2025**
Exam Duration	**: 90 minutes** **Maximum Marks: 50**

General instruction(s): Statistical Tables are permitted

- Answer All Questions
- M - Max marks; CO – Course Outcomes; BL – Blooms Taxonomy Level
- Course Outcomes
  CO2: Understand the basic concepts of random variables and find an appropriate distribution for analyzing data specific to an experiment.
  CO3: Apply statistical methods like correlation, regression analysis in analyzing, and interpreting experimental data.
  CO4: Make appropriate decisions using statistical inference that is the central to experimental research.

Q. No	Question	M	CO	BL
1.	a. Ten competitors in a competition were ranked by two judges in the following orders Judge 1: 6 4 3 1 2 7 9 8 10 5 Judge 2: 4 1 6 7 5 8 10 9 3 2 Use the method of rank correlation to determine whether the judges has the nearest approach to the finalist in competition.	5	3	3
	b. There are two series of index numbers P for price index and S for stock of the commodity. The mean and standard deviation of P are 100 and 8 and of S are 103 and 4 respectively. The correlation coefficient between the two series is 0.4. With these data A. obtain the regression lines of P on S and S on P. B. the most likely value of P when S=10.	5		
2.	A shipment of 10 boxes of meat contains 2 boxes of contaminated goods. An inspector randomly selects 4 boxes; let Z be the number of boxes of contaminated meat among the selected 4 boxes. (a) What is the probability mass function of Z? (b) What is the probability that at least one of the four boxes is	10	2	2

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	contaminated? (c) How many boxes must be selected so that the probability of having at last one contaminated box is larger than 0.75?			
3.	a) The life of a power transmission tower is exponentially distributed, with mean life 25 years. If three towers, operated independently, are being erected at the same time, what is the probability that at least 2 will still stand after 35 years?	5	2	3
	b) In a recent study on world happiness, participants were asked to evaluate their current lives on a scale from 0 to 10, where 0 represents the worst possible life and 10 represents the best possible life. The responses were normally distributed, with a mean of 5.4 and a standard deviation of 2.2. Find the probability that a randomly selected study participant's response was: (a) Less than 4 (b) Between 4 and 6?	5		
4.	Two types of medication for hives are tested to determine if there is a difference in the proportions of adult patient reactions. In a sample of 200 adults given medication A, 20 still had hives 30 minutes after taking the medication. In a sample of 200 adults given medication B, 12 still had hives 30 minutes after taking the medication. At the 1% significance level, is there a difference in the proportion of adults who still have hives 30 minutes after taking medications?	10	4	3
5.	In a certain factory there are two independent processes of manufacturing the same item. The average weight in a sample of 250 items produced from one process is found to be 120 ozs with a S.D of 12 ozs. While the corresponding figures in a sample of 400 items from the other process are 124 and 14. Find the standard Error of difference between the two sample means. Is this difference significant? Also find the 99% confidence limits for the difference in the average weights of items produced by the two processes respectively.	10	4	3

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