REG.NO.:

VIT

Vellore Institute of Technology

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

SLOT: B2+TB2

Programme Name & Branch	:	B.Tech
Course Code and Course Name	:	BMAT202L - Probability and Statistics
Faculty Name(s)	:	Common Slot QP
Class Number(s)	:	Common Slot QP
Date of Examination	:	17.03.2025
Exam Duration	:	90 minutes

Maximum Marks: 50

General instruction(s):

- Statistical tables are permitted.
- Answer All Questions
- M- Max marks; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- 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, interpreting experimental data.
  CO4: Make appropriate decisions using statistical inference that is the central to experimental research.

Q.No	Question	M	CO	BL
1.	The grades of a class of 8 students on internal assessment (X) and on final assessment (Y) are as follows X: 22, 26, 29, 30, 31, 31, 34, 35 Y: 20, 20, 21, 29, 27, 24, 27, 31 (i) Estimate the linear regression lines. (ii) Estimate the final assessment grade of a student who has scored 38 in the internal assessment. (iii) Find the coefficient of correlation between X and Y.	10	3	3
2.	a) A pharmaceutical lab states that a drug causes negative side effects in 3 of every 100 patients. To confirm this affirmation, another laboratory chooses 5 people at random who have consumed the drug. What is the probability that (i) none of the five patients experience side effects? (ii) atleast two experience side effects? b) In a component manufacturing industry, there is a small probability of $\frac{1}{500}$ for any component to be defective. The components are supplied in packets of 10. For a consignment of 10,000 packets, use Poisson distribution to calculate the approximate number of packets containing (i) one defective, (ii) atleast one defective.	10	2	2

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3.	In a normal distribution 10% of the items are under 35 and 5% are above 90. Find the mean and standard deviation of the distribution.	10	2	3
4.	A car manufacturer aims to improve the quality of the products by reducing the defects and also increase the customer satisfaction. Therefore, he monitors the efficiency of two assembly lines in the shop floor. In line A there are 18 defects reported out of 200 samples. While the line B shows 25 defects out of 600 cars. At a 5% significance level, is there a difference between two assembly procedures significant?	10	4	3
5.	There are two groups of students preparing for a competition: Group A and Group B. Group A has studied offline classes, while Group B has studied online classes. After the examination, based on the score of each student, we have the following observation.	10	4	3

	Group A	Group B
Sample Size	50	60
Sample mean	75	80
Sample Standard Deviation	10	12

Assuming a 5% significance level, perform a two-sample z-test to determine if there is a significant difference between the online and offline classes.

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