



VIT[®]
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act 1956)

SCHOOL OF ADVANCED SCIENCES

Fall Semester 2023-2024

Continuous Assessment Test – II

Programme Name & Branch B.Tech & BSS

Slot: E2+TE2

Course Name & code: PROBABILITY AND STATISTICS - MAT 1017

Class Number (s): VL2023240106038

Faculty Name (s): Dr Rajendran P

Exam Duration: 90 Min.

Maximum Marks: 50

General instruction(s):

Q.No.	Question	Max Marks
1.	a) One in eight containers is temporarily misplaced. A random sample of 12 containers is selected. What is the probability that 6 of these containers will be temporarily misplaced? [5 marks] b) According to a recent poll by the PRN Internet Project, students between the ages of 14 and 17 send an average of 0.187 text messages each day. Let X = the number of text messages that a student aged 14 to 17 sends per day. The discrete random variable X takes on the values $x = 0, 1, 2, \dots$. The random variable X has a Poisson distribution: $X \sim P(0.187)$. The mean is 0.187 text messages. What is the probability that a student sends exactly 2 text messages per day? [5 marks]	10
2.	The speed of cars is measured using a radar unit, on a motorway. The speed is normally distributed with a mean of 90 km/hr and a standard deviation of 10 km/hr. (i) What is the probability that a car selected at chance is moving at more than 100 km/hr? (ii) What is the probability that a car selected at chance is moving at less than 80 km/hr?	10
3.	The time (in hours) required to repair a roll-top is an exponentially distributed random variable with parameter $\lambda = 1/2$. What is (a) the probability that a repair time exceeds 2 hours? (b) the conditional probability that a repair takes at least 12	10

	hours, given that its duration exceeds 10 hours?	
4.	Evaluate $\iint_D [2yx^2 + 9y^3] dy dx$, where D is the region bounded by the two curves $y = \frac{2x}{3}$ and $y = 2\sqrt{x}$.	10
5.	Evaluate the triple integral $\int_0^4 \int_0^{\frac{12-3x}{6}} \int_0^{12-3x-6y} dz dy dx$	10