Register Number | | | | | | | | | |

Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam – 603 110

(An Autonomous Institution, Affiliated to Anna University, Chennai)

Department of Mathematics

Continuous Assessment Test – I

Question Paper

Degree & Branch	B.E. CSE, ECE, BME / B.Tech I.T				**Semester**	IV
Subject Code & Name	UMA1477 – Probability Theory & Stochastic Processes UMA1478 – Probability & Statistics				**Regulation: 2018**	
Academic Year	2021-2022	**Batch**	2020-2024	**Date**	**25.03.2022**	**FN**
Time: 90 Minutes	**Answer All Questions**				**Maximum: 50 Marks**	

Part – A (6×2 = 12 Marks)

K1	1. State Bayes' theorem	CO1	1.1.1
K2	2. A continuous random variable X has the pdf given by $f(x) = ce^{-\|x\|}, -\infty < x < \infty$. Find the value of c	CO1	2.1.3
K2	3. If the mgf of a random variable X is of the form $(0.8e^t + 0.2)^8$, Find $E(X)$	CO1	2.1.3
K2	4. Let X be a random variable with $E(X) = 1$ and $E(X(X-1)) = 4$, find $var\left(\frac{X}{2}\right)$.	CO1	2.1.3
K2	5. If the cumulative distribution function of a random variable X is $F(x) = \begin{cases} 1 - \frac{4}{x^2}, & x > 2 \\ 0 & x \le 2 \end{cases}$, find $P(4 < X < 5)$.	CO1	2.1.3
K1	6. Find the mgf of the random variable whose moments are $\mu'_r = (r+1)!2^r$	CO1	2.1.3

Part – B (3×6 = 18 Marks)

K3	7. A random variable X has the following probability mass function. $X=x$: 0, 1, 2, 3, 4, 5, 6, 7, 8 $p(x)$: a, $3a$, $5a$, $7a$, $9a$, $11a$, $13a$, $15a$, $17a$ i. Determine the value of a. ii. Find $P(X < 3), P(X \ge 3), P(0 < X < 5)$ iii. Find the distribution function of X.	CO1	2.1.3
K3	8. Prove that the sum of two independent Poisson variates is Poisson but the difference is not.	CO1	1.1.1
K3	9. State and Prove memory less property for Geometric distribution	CO1	1.1.1

Part – C (2×10 = 20 Marks)

K3	10. There are 3 true coins and 1 false coin with head on both sides. A coin is chosen at random and tossed 4 times. If head occurs all the 4 times, what is the probability that the false coin has been chosen and used?	CO1	2.1.3
	(Or)		
K3	11. If the density function of a continuous random variable X is given by $f(x) = \begin{cases} ax & 0 \le x < 1 \\ a & 1 \le x < 2 \\ 3a - ax & 2 \le x < 3 \\ 0 & otherwise \end{cases}$ (a) Find the value of a (b) Find the cumulative distribution function of X.	CO1	2.1.3
K3	12. Find the moment generating function, mean and variance of a Binomial Distribution	CO1	1.1.1
	(Or)		
K3	13. In a distribution exactly normal, 7% of the items are under 35 and 89% are under 63. Find the mean and S.D of the distribution. From the normal table: Area = 0.19, Z = 0.5 Area = 0.29, Z = 0.81 Area = 0.39, Z = 1.23 Area = 0.41, Z = 1.35 Area = 0.42, Z = 1.4 Area = 0.43, Z = 1.48	CO1	2.1.3

CO1: Identify standard distributions and apply them.

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