NARSIMHA REDDY ENGINEERING COLLEGE
UGC AUTONOMOUS INSTITUTION
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UGC - Autonomous Institute
Accredited by NBA & NAAC with 'A' Grade
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UNIT–II

Continuous Distributions and Sampling

S. No	Questions	BT	CO	PO
	Part – A (Short Answer Questions)			
1	Define expectation of a random variable X	L1	CO2	PO1
2	Define variance of a random variable X for discrete and continuous cases.	L1	CO2	PO1
3	Let X be a random variable with density function $f(x)=\begin{cases}\frac{x^3}{3}, -1<x<2\\ 0, else\ where\end{cases}$ Find the expected value of g(x)=4x+3	L3	CO2	PO2
4	Let the random variable X represent the number of defective parts for a machine when 3 parts are sampled from a production line and tested. The following is the probability distribution of X. X: 0, 1, 2, 3 F(x): 0.51, 0.38, 0.10, 0.01 Calculate E(X) and $E(X^2)$.	L3	CO2	PO2
5	20% of item produced from a factory are defective. Find the probability that in a sample of 5 chosen at random P(1<x<4).	L3	CO2	PO2
6	If the probability of a defective bolt is 0.2 find the mean and variances of the number of successes.	L3	CO2	PO2
7	Define geometric distribution.	L1	CO2	PO1
8	If a random variable has a Poisson distribution such that P(1) =P(2), find mean of the distribution.	L3	CO2	PO2
9	Using Poisson distribution, find the probability that the ace of spades will be drawn from a pack of well shuffled cards at least once in 104 consecutive trials.	L3	CO2	PO2
10	In 256 set of 12 tosses of a coin, in how many cases one can expect 8 heads and 4 tails.	L3	CO2	PO2
	Part – B (Long Answer Questions)			
11	Seven coins are tossed and the number of heads are noted. The experiment is repeated 128 times and the following distribution is obtained. Fit a Binomial Distribution to the following data assuming the coin is unbiased x: 0, 1, 2, 3, 4, 5, 6, 7	L3,L5	CO2	PO3

		f 7 6 19 35 30 23 7 1			
12	a)	Using recurrence formula find the probabilities when X=0,1,2,3,4 and 5, if the mean of Poisson distribution is 3.	L3,L5	CO2	PO3
	b)	If the probability that an individual suffers a bad reaction from a certain injection is 0.001, determine the probability that out of 2000 individuals i. Exactly 3 ii. More than 2 individuals iii. None iv. More than one individual suffers bad reaction	L3	CO2	PO2
13	a)	Derive mean and variance of Geometric Distribution	L1	CO2	PO1
	b)	The weekly demand for a drinking-water product, in thousands of liters, from a local chain of efficiency stores is a continuous random variable X having the probability density. Find mean and variance. $f(x) = \begin{cases} 2(x-1); 1 < x < 2 \\ 0; else\ where \end{cases}$	L3	CO2	PO2
14		Out of 800 families with 5 children each, how many would you expect to have a. 3boys b. 5girls c. At least one boy d. Mean e. Variance	L3,L4,L5	CO2	PO3
15	a)	Derive mean and variance of Poisson distribution	L1	CO2	PO1
	b)	A die is tossed until 6 appears. Find the probability that it must be cast more than 5 times.	L2	CO2	PO2
16	a)	If a Poisson Distribution is such that $\frac{3}{2}P(X=1) = P(X=3)$. Find i. P(X≥1) ii. P(X≤3)	L2	CO2	PO2
	b)	Calculate the variance of g(X)=2X + 3, where X is a random variable with the following probability distribution x: 0 1 2 3 F(x): 1/4 1/8 1/2 1/8	L3	CO2	PO2