

INDIRA UNIVERSITY, PUNE

SCHOOL OF INFORMATION TECHNOLOGY- BSC DS

Term End Examination (2025 Pattern) April- May – 2026- Semester – II

Course Name: Discrete Probability and Probability Distributions
Course Code: 25BDS202T

Max. Marks: 25
Time: 1:30 Hrs.

Instructions

- All questions are compulsory.
- Use of non-programmable scientific calculator is allowed.

Q1.	Attempt any 5 out of 7. (1 Mark each) a) Define complement of an event A. b) Define discrete random variable (r. v.). c) State any one property of probability mass function. d) Define expectation of a discrete random variable. e) Write mean of Geometric distribution with parameter $p = 0.25$. f) Define independence of two events with formula. g) If A and B are mutually exclusive events, then $P(A \cup B) = \underline{\hspace{1cm}}$?	(5 marks)	CO-1												
Q2.	Attempt any 2 out of 4. (5 marks each) a) What is classical definition of probability? State Axioms of Probability. b) If $X \sim \text{Binomial}(n=8, p=0.3)$, find i) $P(X \leq 1)$ ii) Find mean and variance of X. c) Define Poisson distribution with one real life illustration. State the Poisson Approximation to Binomial distribution. d) A factory has two machines M_1 and M_2 . M_1 produces 60% of items and M_2 produces 40%. The defective rates are 2% and 5% respectively. If an item is defective, find the probability it was produced by M_2 .	(10 marks)	CO-2												
Q3	Attempt all questions- a) Generate random sample of size 5 from discrete uniform distribution with $n = 8$. b) Following is the probability mass function of a discrete r.v. X : <table border="1"><tr><td>X</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>F(x)</td><td>0.2</td><td>0.4</td><td>0.7</td><td>0.9</td><td>1.0</td></tr></table> i) Find the P(x) using F(x) ii) $P(X \geq 2)$ OR	X	0	1	2	3	4	F(x)	0.2	0.4	0.7	0.9	1.0	(5 marks) (5 marks)	CO-3
X	0	1	2	3	4										
F(x)	0.2	0.4	0.7	0.9	1.0										

Q.3	Attempt all questions - a) Use the concepts of discrete and continuous random variables to explain their differences, with suitable real-world examples. (5 Marks) b) Apply probability concepts to determine: i) the probability that both drawn cards are Hearts. ii) the probability of drawing a King and a Queen from a standard deck of 52 cards (5 Marks)	CO-3
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