INDIRA UNIVERSITY, PUNE

SCHOOL OF INFORMATION TECHNOLOGY-AIML

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

Course Name: Probability Distributions and Testing of Hypothesis **Max. Marks: 25**

Course Code: 25AML203T **Time: 1:30 Hrs.**

Instructions

- All questions are compulsory.
- Use of Scientific Non-programmable calculator is allowed.
- Use of statistical table is allowed.

Q1.	**Attempt any 5 out of 7. (1 Mark each) (5 Marks)** a) State the probability density function of continuous uniform distribution with proper notations. b) What would be the variance of X if it follows binomial distribution with n = 10 and p = 0.6. c) State Poisson distribution as a limiting form of binomial distribution. d) State the probability mass function of Bernoulli distribution with parameter 'p'. e) Define critical region. f) Write the formula of the test statistic for the Z test of equality of two population proportions. g) Find P(Z > 0), where Z is a standard normal variate (SNV).	**CO 1**
Q2.	**Attempt any 2 out of 4. (5 marks each) (10 Marks)** a) Explain Binomial distribution and its additive property. b) $X \rightarrow N(20, 16)$. Convert this random variable X into SNV and find $P(16 \leq X \leq 24)$ [Given : P(Z > 1.25) = 0.10565 , P(Z > 1) =0.15865] c) The total duration of baseball games in the major league in 2025 seasons is uniformly distributed between 447 hours and 521 hours inclusive. Find the mean and variance of the distribution. What is the probability that the duration of games for a team for 2025 season is between 480 and 500 hours.	**CO 2**

	d) Define the following terms: i) Type I error ii) Type II error iii) Population iv) Sample v) Parameter	
Q.3	**Attempt all questions** **i.** The mileage which car owners get with a certain kind of radial tyre is a random variable having an exponential distribution with mean 40,000 km. Find the probabilities that one of these tyres will last (a) atleast 20,000 km and (b) atmost 30,000 km. **(5 Marks)** **ii.** If X follows N (3, 25) and Y follows N (4, 36). Then identify distribution with parameters of following variables. a) X+Y b) X-Y c) 2X+Y d) (X-3)/5 e) 2X+3Y-4 **(5 Marks)** **OR**	**CO 3**
Q.3	**Attempt all questions.** **i.** A machine is producing 4% defectives. What is the probability of getting exactly 4 defectives in a sample of 50 using: **(5 Marks)** a. Binomial distribution b. Poisson approximation to Binomial Distribution. **ii.** Construct the steps for testing the hypothesis for single population Mean. **(5 Marks)**	**CO 3**

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