

Reg. No.:



Name:

University of Kerala

U8894

Second Semester FYUGP Degree Examination, April 2025

Discipline Specific Core Course

STATISTICS

UK2DSCSTA103 - GEOSTATISTICS II

Academic Level: 100-199

Time: 1 Hour 30 Minutes(90 Mins.)

Max. Marks: 42

Part A. 6 Marks.Time:6 Minutes.(Cognitive Level:Remember(RE)/Understand(UN)) Objective Type. 1 Mark Each.Answer all questions

Qn No.	Question	CL	CO
1	The total area under the normal curve is equal to _____	RE	6
2	When will you say that two events are independent?	RE	3
3	State whether True or False: The standard deviation of the Chi-Square distribution is twice the mean.	UN	7
4	Name a distribution in which mean always greater than variance	UN	4
5	If two events A and B are mutually exhaustive, then $P(A \cup B)$ is: Options : A)1 B)0 C)Either 0 or 1 D)None of these	UN	2
6	If $P(A) = 1/3$, $P(B) = 2/3$ and $P(A \cap B) = 2/9$, then can you say that A & B are independent?	UN	3

Part B.8 Marks.Time:24 Minutes.(Cognitive Level:Understand(UN)/Apply(AP))Short Answer. 2 marks each.Answer all questions

Qn No.	Question	CL	CO
7	Write down the conditions to be satisfied for the independence of 3 events.	UN	3
8	State central limit theorem.	UN	7
9	If $P(t > t_\alpha) = 0.05$, Find t_α from t- tables for 11 degrees of freedom.	AP	7
10	A die is thrown. Let E be the event that the number appearing is a multiple of 3 & F be the event that the number appearing is even. Find whether E & F are independent.	AP	3

Part C. 28 Marks.Time:60 Minutes (Cognitive Level:Apply(AP)/Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer.7 marks each.Answer all 4 Questions choosing among options * within each question

Qn No.	Question	CL	CO
11	A) If $P(A) = p_1$, $P(B) = p_2$, and $P(AB) = p_3$, where p_1 , p_2 and p_3 are all positive reals, find out the following probabilities in terms of p_1 , p_2 and p_3 . $P(A \cup B)$, $P(A^c \cup B^c)$,	AP	2, 3

Qn No.	Question	CL	CO
	$P(A^C \cap B^C),$ $P(A^C \cap B).$ OR B) Three boxes A_1, A_2 and A_3 contain lamp bulbs some of which are defective. The proportion of defective in A_1, A_2 and A_3 are $1/2, 1/8$ and $3/4$ respectively. A box is selected at random and a bulb is drawn from it. If the selected bulb is found to be defective, what is the probability that box A_1 was chosen		
12	A) a. If Z is a standard normal variate, find $P(z^2 > 5.024)$. . Also, describe the procedure of finding this probability. b. A sample of size 10 is taken from a normal population with mean 5 & S.D 2 write down the distribution of its Mean. OR B) A drug has a 90% success rate. In a clinical trial of 50 patients, researchers want to know the probability of different success levels. What is the probability that exactly 45 patients experience success? What is the probability that between 40 and 48 patients (inclusive) experience success? What is the probability that less than 42 patients experience success?	AN	7, 4
13	A) Evaluate the following from the students' t table. a. Find the value of t_α if $p(t > t_\alpha) = 0.05$ for 13 degrees of freedom. b. Find the value of t_α if $p(t > t_\alpha) = 0.10$ for 5 degrees of freedom. c. Find $p(t > 2.414)$ for 1 degrees of freedom. OR B) A machine fills bottles with a liquid detergent. The advertised volume per bottle is 500 ml. Due to slight variations in the filling process, the actual volume dispensed follows a normal distribution with a mean of 502 ml and a standard deviation of 3 ml. Evaluate the consistency of this filling process by calculating the probability that a randomly selected bottle will contain less than the advertised volume (500 ml). Based on this probability, would you consider the filling process to be consistently meeting the advertised volume? Justify your evaluation	EV	7, 6
14	A) A climatologist is studying the urban heat island effect. 60% of the area is highly urbanized (City C), and 40% is less urbanized (City D). The probability of observing an extreme temperature event in City C is 0.7, and in City D is 0.4. An extreme temperature event is observed. What is the probability it occurred in City C? OR B) Develop a sample space of an arbitrary random experiment for illustrating equally likely, mutually exclusive and exhaustive events, with clear specifications.	CR	3, 2