SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF MATHEMATICS
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2021-2022

SLOT-A1
ODD

Test: CLAT-2
Course Code & Title: 18MAB204T / Probability ang Queueing Theory
Year & Sem: II & IV

Date: 24/05/2022
Duration: 100 min
Max. Marks: 50

Course Articulation Matrix:

At the end of this course, learners will be able to:		Program Outcomes (PO)											
Course Outcomes (CO)	Learning Bloom's Level	1	2	3	4	5	6	7	8	9	10	11	12
CO1	Apply the concepts of probability and random variables in engineering problems.	4	3	3										
CO2	Identify random variables and model them using various distributions.	4	3	3										
CO3	Infer results by using hypothesis testing on large and small samples	4	3	3										
CO4	Examine F test, Chi Square test in sampling techniques and analyse the performance measures of queuing models.	4	3	3										
CO5	Determine the transition probabilities and classify the states of Markov chain.	4	3	3										
CO6	Apply probability techniques and implement them in the study on sampling distributions, queueing models and Markov chain	4	3	3										

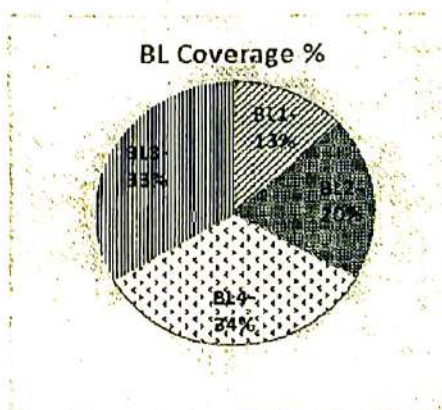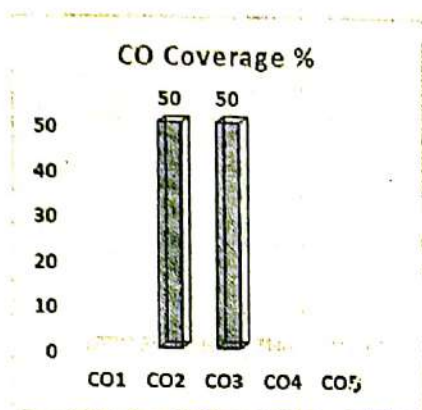|	Part – A (5 x 4 = 20 Marks) Answer all the questions					
Q. No.	Question	Marks	BL	CO	PO	PI Code
1	The probability that a bomb dropped from a plane will strike the target is 1/8. If 6 bombs are dropped, find the probability that at least 1 will strike the target.	4	1	2	1	1.2.2
2	Suppose that the amount of waiting time a customer spends at a restaurant has an exponential distribution with a mean value of 6 minutes. Find the probability that a customer will spend more than 12 minutes in the restaurant.	4	2	2	1	1.2.2
3	4% of the products supplied by a manufacturer are defective. A random sample of 600 products contained 36 defectives. Test whether there is any significant difference.	4	2	3	2	2.8.1
4	A sample of 400 members gave a mean of 6.75. Ca it be reasonably regarded as a sample drawn from a normal population of mean 6.8 and S.D of 1.5?	4	2	3	2	2.8.1
5 (i)	In the busy time the probability of getting telephone connection is 0.05. What is the probability of one getting connection in the 5th attempt?	2	1	2	1	1.2.2
(ii)	A bag contains defective articles, the exact number of which is not known. A sample of 100 from the bag gives 10 defective articles. Find the 95% condifidence limits for the proportion of defective articles.	2	1	3	1	1.2.2
	Part-B (3 x 10 = 30 Marks) Answer Any THREE questions					
6	Fit a Poisson distribution for the following distribution and hence find the theoretical frequencies.	10	3	2	1	1.2.2

x	0	1	2	3	4	5
f	142	156	69	27	58	1

7	In a normal distribution 15% of the items are under 30 and 9% are over 60. Find the mean and S.D of the distribution.	10	3	2	1	1.2.2
8	A machine produces 16 defective bolts in a batch of 500 bolts. After the machine is overhauled, it produces 3 defective bolts in a batch of 100 bolts. Has the machine improved?	10	4	3	2	2.8.1
9	Two independent samples of sizes 5 and 6 contain the following values	10	4	3	2	2.8.1

Question 9 data:

Sample 1	21	13	15	13	17	-
Sample 2	12	14	12	16	11	20

Is the difference between the means significant?

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions

CO Coverage %

BL Coverage %

Evaluation Sheet

Name of the Student:

Register No.

R.	A											

Part - A (5x4=20 Marks)			
Q. No	CO	Marks Obtained	Total
1	2		
2	2		
3	3		
4	3		
5 (i)	2		
5 (ii)	3		

Part- B (3x 10= 30 Marks)			
6	2		
7	2		
8	3		
9	3		

Consolidated Marks:

CO	Marks Scored
CO2	
CO3	
Total	

Signature of the Course Teacher

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DEPARTMENT OF MATHEMATICS
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2021-2022

SLOT A2

ODD

Test: CLAT-2
Course Code & Title: 18MAB204T / Probability and Queueing Theory
Year & Sem: II & IV
Course Articulation Matrix:

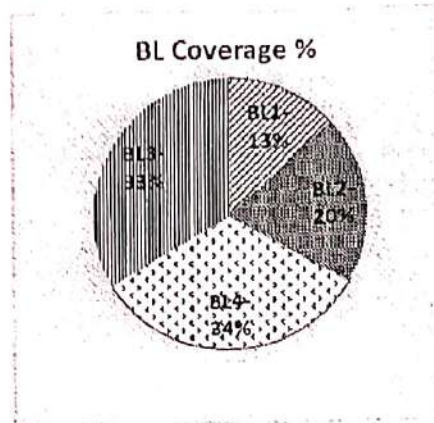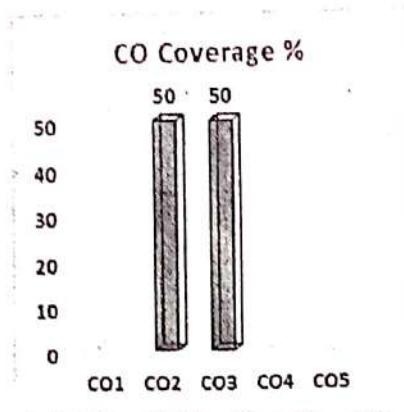**Date:** 24/05/2022
Duration: 100 min
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At the end of this course, learners will be able to:		Learning Bloom's Level	Program Outcomes (PO)												
Course Outcomes (CO)			1	2	3	4	5	6	7	8	9	10	11	12
CO1	Apply the concepts of probability and random variables in engineering problems.	4	3	3											
CO2	Identify random variables and model them using various distributions.	4	3	3											
CO3	Infer results by using hypothesis testing on large and small samples	4	3	3											
CO4	Examine F test, Chi Square test in sampling techniques and analyse the performance measures of queuing models.	4	3	3											
CO5	Determine the transition probabilities and classify the states of Markov chain.	4	3	3											
CO6	Apply probability techniques and implement them in the study on sampling distributions, queueing models and Markov chain	4	3	3											

Part – A (5 x 4 = 20 Marks) Answer all the questions						
Q. No.	**Question**	**Marks**	**BL**	**CO**	**PO**	**PI Code**
1	The mean and variance of a Binomial distribution are 2 and $\frac{2}{3}$ respectively. Find $P(X = 2)$	4	1	2	1	1.2.2
2	The length of the shower on a tropical island during rainy season has an exponential distribution with parameter 2, (time measured in minutes). If a shower has already lasted for 2 minutes, what is the probability it will last two more minutes?	4	2	2	1	1.2.2
3	A coin is thrown 400 times and is found to result in head 245 times. Test whether the coin is a fair one?	4	2	3	2	2.8.1
4	The 9 items of a sample have the following values: Sample mean 49 and S. D 2.58. Does the mean of these values differ significantly from the assumed mean 47.5?	4	2	3	2	2.8.1
5 (i)	In a busy time, the probability of getting telephone connection is 0.05. What is the probability of one getting connection in the 5th attempt?	2	1	2	1	1.2.2
(ii)	The mean value of a random sample of 10 items was found to be 165 with S.D. of 7.6. Find the 95% confidence limits of μ.	2	1	3	1	1.2.2

Part-B (3 x 10 = 30 Marks) Answer Any THREE Questions						
6	Fit a Poisson distribution for the following distribution and hence find the theoretical frequencies <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>f</td><td>123</td><td>59</td><td>14</td><td>3</td><td>1</td></tr></table>	10	3	2	1	1.2.2
7	In a normal distribution 25% of the items are under 40 and 6% are over 70. Find the mean and S.D of the distribution.	10	3	2	1	1.2.2

8	A random sample of 600 men chosen from a certain city contained 400 smokers. In another sample of 900 men chosen from another city, there were 450 smokers. Do the data indicate that the first city contains more smokers than the second?	10	4	3	2	2.8.1
9	Two independent samples of sizes 5 and 6 contain the following values.	10	4	3	2	2.8.1

Sample 1	9	11	13	11	15	-
Sample 2	10	12	10	14	9	8

Is the difference between the means significant?

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions

CO Coverage %

BL Coverage %

Evaluation Sheet

Name of the Student:

Register No. | R | A | | | | | | | | | | | |

Part - A (5x4=20 Marks)			
Q. No	CO	Marks Obtained	Total
1	2		
2	2		
3	3		
4	3		
5 (i)	2		
5 (ii)	3		
Part- B (3x 10= 30 Marks)			
6	2		
7	2		
8	3		
9	3		

Consolidated Marks:

CO	Marks Scored
CO2	
CO3	
Total	

Signature of the Course Teacher

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DEPARTMENT OF MATHEMATICS

SRM Nagar, Kattankulathur -- 603203, Chengalpattu District, Tamilnadu

SLOT-A2

EVEN

Academic Year: 2021-2022

Test: CLAT-2

Course Code & Title: 18MAB204T & Probability and Queueing Theory
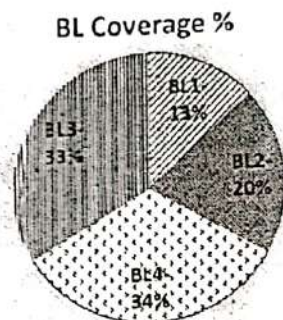
Year & Sem: II & IV / (CSE)

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Part – A (5 x 4 = 20 Marks)
Answer all the questions.

Q. No.	Question	Marks	BL	CO	PO	PI Code
1	If X is a Poisson variate such that $P(X = 1) = P(X = 2)$ find $P(X = 4)$.	4	1	2	1	1.2.2
2	The probability that a person hits a target on any given trial is 0.6, Find the probability that he will hit the target before the 4th trial?	4	2	2	1	1.2.2
3	The average marks in Mathematics of a sample of 100 students was 51 with a S.D of 6 marks. Could this have been a random sample from a population with average marks 50?	4	2	3	2	2.8.1
4	A random sample of 13 students gave a mean weight of 58 kg with a S.D of 4 kg. Test the hypothesis that the mean weight in the population is 60 kg.	4	2	3	2	2.8.1
5 (i)	The mileage which car owners get with a certain kind of radial tyre is a RV having an exponential distribution with mean 4,000 km. Find the probabilities that one of these tyres will last at least 2000 km.	2	1	2	1	1.2.2
(ii)	A random sample of 500 toys was taken from a large consignment and 65 were found to be defective. Find the 95% confidence limits of the defective toys in the consignment.	2	1	3	1	1.2.2

Part-B (3 x 10= 30 Marks)
Answer any THREE questions.

6	Fit a Binomial distribution for the following distribution and hence find the theoretical frequencies	10	3	2	1	1.2.2

x	0	1	2	3	4
f	7	27	34	27	5

7	If X is normally distributed with mean 30 and S.D 5, find (i) $P(26 \leq X \leq 40)$ (ii) $P(X \leq 25)$ and (iii) $P(X \geq 42)$.	10	3	2	1	1.2.2
8	A simple sample of heights of 6400 English men has a mean of 170 cm and an S.D of 6.4 cm, while a simple sample of heights of 1600 Americans has a mean of 172 cm and an S.D of 6.3 cm. Do the data indicate that Americans are, on the average, taller than the Englishmen?	10	4	3	2	2.8.1
9	Memory capacity of 9 students was tested before and after a course of meditation for a month. State whether the course was effective or not from the data below.	10	4	3	2	2.8.1

Before	10	15	9	3	7	12	16	17	4
After	33	35	35	11	34	29	21	28	32

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions

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7	2		
8	3		
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