

Subject Name: Probability Theory and Stochastic processes**Year /Sem: II/I****Academic Year:2019-20.****Activity Name: Group Problem Solving****Questions**

S.No	Question	CO Addressed
1	a) A family has two children. It is known that at-least one of the children is a girl then what is the probability that both the children are girls? (1M)	CO3
	b) State and prove any three properties of conditional probability.(2M)	CO4
2	a) Roll a red die and a green die. Find the probability that total is 5.(1M)	CO1
	b)A book containing 100 pages is opened at random. Find the probability that on the page. i) A doublet is found. ii) a number whose sum of digits is 10. (1M)	CO3
3	In a class 2% of Boys and 3% of Girls are having blue eyes, there are 30% of girls in the class. If a student is selected and having blue eyes, what is the probability that student is girl. (1M)	CO3
4	A letter is known as to have come from either TATANAGAR or CALCUTTA. On the envelope, just two consecutive letters "TA" are visible. Find the probability that the letter has come from CALCUTTA. (2M)	CO3
5	Professor Random has taught probability for many years. She has found that 80% of students who do the homework pass the exam, while 10% of students who don't do the homework pass the exam. If 60% of the students do the homework, what percent of students pass the exam? Of students who pass the exam, what percent did the homework? (2M)	CO3

Description of the Activity: Based on the Concept covered in the class, staff will give a set of problems to each group, after completion of the task, each group will be given a few minutes to discuss their solutions in the class.

- Each group consists of 3-5 members.
- Each group is formed such that it covers all levels of students.

Rubric for Group problem solving:

Team Work - 5 Marks

Answering Ability (Individual) - 5 Marks

Total : 10 Marks

S. No	Criteria	Scale of Assessment		
		Satisfactory	Good	Excellent
1	Team work	Distracts or discourages other group members from solving problems.	Cooperates with other group members in a reasonable manner	Actively engages and cooperates with other group members in an effective manner.
2	Answering ability	Student is uncomfortable with information. Seems novice and can answer basic questions only.	Student has competent knowledge and is at ease with information. Can answer questions.	Student has presented full knowledge of both problem and solution. Answers to questions are strengthened by rationalization and explanation.

Photo Gallery:



Evaluation Sheets:**Section A:**

S.No	Batch No.	H.T .No.	Team work (5M)	Answering ability (5M)	Total (10M)
1	1	18K41A0404	4	4	8
2		18K41A0419	4	4	8
3		18K41A0430	4	4	8
4		18K41A0450	4	4	8
5		18K41A0456	4	4	8
6	2	18K41A0401	4.5	4	9
7		18K41A0421	4.5	4	9
8		18K41A0409	4.5	4	9
9		18K41A0405	4.5	4	9
10		18K41A0425	4.5	4	9
11	3	18K41A0407	4	4	8
12		18K41A0412	4	4	8
13		18K41A0428	4	4	8
14		18K41A0410	4	4	8
15		18K41A0427	4	4	8
16	4	18K41A0415	4	3	7
17		18K41A0406	4	3	7
18		18K41A0443	4	3	7
19		18K41A0432	4	3	7
20		19K45A0401	4	3	7
21	5	18K41A0439	4	3	7
22		18K41A0420	4	3	7
23		18K41A0431	4	3	7
24		18K41A0435	4	3	7
25		19K45A0406	4	3	7
26	6	18K41A0437	2	3	5
27		18K41A0458	2	3	5
28		18K41A0447	2	3	5
29		18K41A0448	2	3	5
30		18K41A0446	2	3	5
31		18K41A0417	2	2	4
32	7	18K41A0402	4	4.5	9
33		18K41A0403	4	4.5	9

34		18K41A0445	4	4.5	9
35		18K41A0440	4	4.5	9
36		18K41A0433	4	4.5	9
37		18K41A0452	4	4.5	9
38	8	18K41A0444	2	2	4
39		18K41A0442	2	2	4
40		18K41A0451	2	2	4
41		18K41A0457	2	2	4
42		19K45A0402	2	2	4
43		18K41A0413	2	2	4
44	9	18K41A0441	4.5	4	9
45		18K41A0453	4.5	4	9
46		18K41A0418	4.5	4	9
47		18K41A0422	4.5	4	9
48		18K41A0426	4.5	4	9
49	10	18K41A0423	5	5	10
50		18K41A0449	5	5	10
51		18K41A0459	5	5	10
52		18K41A0455	5	5	10
53		18K41A0436	5	5	10
54	11	18K41A0454	4	3	7
55		18K41A0411	4	3	7
56		18K41A0429	4	3	7
57		18K41A0424	4	3	7
58		18K41A0438	4	3	7
59		18K41A0460	4	0	4

Section B:

S.No	Batch No.	H.T .No.	Team work (5M)	Answering ability (5M)	Total (10M)
1	1	18K41A0469	5	5	10
2		18K41A0480	5	5	10
3		18K41A0481	5	5	10
4		18K41A0485	5	5	10
5		18K41A0488	5	5	10
6	2	18K41A0462	5	5	10
7		18K41A0464	5	5	10

8		18K41A0468	5	5	10
9		18K41A0490	5	5	10
10		18K41A0492	5	5	10
11	3	18K41A0491	4	4.5	9
12		18K41A0479	4	4.5	9
13		18K41A0476	4	4.5	9
14		18K41A0478	4	4.5	9
15		18K41A0484	4	4.5	9
16		19K45A0410	4	4	8
17	4	18K41A0474	2	4	6
18		18K41A0471	2	4	6
19		18K41A0467	2	4	6
20		18K41A0483	2	4	6
21		19K45A0486	2	4	6
22	5	18K41A0461	5	5	10
23		18K41A0465	5	5	10
24		18K41A0473	5	5	10
25		18K41A04A7	5	5	10
26		18K41A04B5	5	5	10
27	6	18K41A04A8	2	4	6
28		18K41A04A5	2	4	6
29		18K41A04B3	2	4	6
30		18K41A04C0	2	4	6
31		18K41A0493	2	4	6
32		18K41A04A9	2	4	6
33	7	18K41A0470	5	5	10
34		18K41A0472	5	5	10
35		18K41A0482	5	5	10
36		18K41A04A0	5	5	10
37		18K41A0498	5	5	10
38	8	18K41A0466	4.5	4	9
39		18K41A04B6	4.5	4	9
40		18K41A04A1	4.5	4	9
41		18K41A0495	4.5	4	9
42		18K41A04A3	4.5	4	9
43		18K41A04A4	4.5	4	9
44	9	18K41A0489	4.5	4	9
45		18K41A04A6	4.5	4	9
46		18K41A04B7	4.5	4	9
47		18K41A0475	4.5	4	9

48		18K41A0499	4.5	4	9
49		18K41A04B1	4.5	4	9
50	10	18K41A0463	5	5	10
51		18K41A0497	5	5	10
52		18K41A04B2	5	5	10
53		18K41A04B4	5	5	10
54		18K41A04B8	5	5	10
55		11	18K41A0494	4	2
56	19K45A0408		4	2	6
57	19K45A0412		4	2	6
58	19K45A0413		4	2	6
59	12	18K41A0487	4	0	4
60		18K41A0496	4	0	4
61		18K41A04B0	4	0	4
62		19K45A0409	4	3	7
63		19K45A0411	4	3	7

Section C:

S.NO	Batch No.	H.T.No	Team Work (5M)	Answering Ability (5M)	Total (10M)
1	1	18K41A04D0	4	2	6
2		18K41A04C8	4	2	6
3		18K41A04C6	4	2	6
4		18K41A04G8	4	2	6
5		18K41A04G9	4	2	6
6		19K45A0415	4	5	9
7	2	18K41A04D7	5	5	10
8		18K41A04C9	5	5	10
9		18K41A04D8	5	5	10
10		18K41A04E0	5	5	10
11		18K41A04E5	5	5	10
12	3	18K41A04C4	5	4	9
13		18K41A04H0	5	4	9
14		18K41A04F1	5	4	9
15		18K41A04F6	5	4	9
16		18K41A04F7	5	4	9
17		18K41A04G4	5	4	9
18		19K45A0414	5	4	9

19	4	18K41A04F3	5	4	9
20		18K41A04G5	5	4	9
21		18K41A04H3	5	4	9
22		18K41A04H4	5	4	9
24		19K45A0416	5	4	9
25	5	18K41A04F2	2	2	4
26		18K41A04G0	2	2	4
27		18K41A04G7	2	2	4
28		18K41A04G3	2	2	4
29		18K41A04G1	2	2	4
30		18K41A04G6	2	2	4
31	6	18K41A04E3	5	5	10
33		18K41A04E6	5	5	10
34		18K41A04E1	5	5	10
35		18K41A04F0	5	5	10
36		18K41A04H1	5	5	10
37	7	18K41A04C2	4	2	6
38		18K41A04D1	4	2	6
39		18K41A04E7	4	2	6
40		18K41A04C7	4	2	6
41		18K41A04F4	4	2	6
42		18K41A04E9	4	2	6
43	8	18K41A04D4	4	5	9
44		18K41A04C5	4	5	9
45		18K41A04E8	4	5	9
46		18K41A04D5	4	5	9
47		18K41A04D6	4	5	9
48		18K41A04D9	4	5	9
49	9	18K41A04D3	5	5	10
51		18K41A04F9	5	5	10
52		18K41A04G2	5	5	10
53		19K45A0417	5	4	9
54		19K45A0418	5	4	9
55		19K45A0420	5	4	9
56	10	17K41A0438	4	1	5
57		17K41A04F5	4	1	5
58		17K41A04F3	4	2	6
59		19K45A0419	4	5	9

60	19K45A0421	4	5	9
61	19K45A0422	4	5	9

Outcome: This activity will develop team work among students.

Activity 2: Quiz (Google form) (10M) (Each Question carries 1 Mark)

Topic Name: Probability, Random variables and Distribution functions

Questions

S.No	Questions	CO Addressed
1	If the events A and B are mutually exclusive, then $P(A \text{ or } B)$ is a) $P(A) + P(B)$ b) $P(A) - P(B)$ c) $P(A) P(B)$ d) $P(A) + P(B) - P(AB)$	CO1
2	The expectation of a Random Variable is equal to its a) variance b) standard deviation c) mean d) none	CO2
3	For a discrete Random Variable, plot of CDF is a a) impulse form b) sinusoidal form c) staircase form d) none.	CO4
4	A set of events is said to be ----- if one of the events cannot be expected in preference to any other. a) Equally likely b) mutually exclusive c) mutually exhaustive d) none.	CO1
5	A die is rolled. If the number is odd, what is the probability that it is prime? a) 1 b) $2/3$ c) $1/3$ d) none	CO3
6	The Gaussian pdf ----- shaped curve. a) rectangular b) triangular c) bell d) square	CO4
7	Mathematical of classical or priori probability definition fails when a) the outcome are not equally likely b) number of outcomes is infinite c) both a and b d) none.	CO1
8	If a Random Variable takes an infinite number of uncountable values, it is called ---- Random Variable. a) continuous b) discrete c) both a and b d) none	CO4
9	If the events A and B are independent, then $P(A/B)$ is	CO1

	a) P(A)	b) P(A/B)	c) P(A) P(B)	d) P(B)	
10	A Random Variable Uniformly distributed over (-a, a) has a pdf given by				CO4
	a) 1/4a	b) 1/3a	c) 1/2a	d) 1/a	

Activity 3: Quiz (Google form) (10M) (Each Question carries 1 Mark)

Topic Name:

Questions

S.No	Question	CO Addressed
1	Which of the following theorem states that “the probability density of a sum of N independent Random Variables to approaches a Gaussian density as the number N tends to infinity ” a) Baye’s theorem b) Central limit theorem c) Channel capacity theorem d) none.	CO4
2	Pick the odd man out a) stochastic variable b) stochastic function c) Random Variable d) random experiment	CO4
3	Which one of the following statement is correct. a) Density of sum of two Random Variables is equal to the convolution of individual densities of the random variables b) Density of sum of two Random Variables is equal to the sum of individual densities of the Random Variables c) Density of sum of two Random Variables is equal to the product of individual densities of the Random Variables. d) None	CO4
4	If statistical averages equals to time averages then the random process is said to be a) Ergodic b) SSS c) WSS d) none	CO4
5	If two random variables are orthogonal then Autocorrelation function is a) 1 b) 0 c) Undefined d) none	CO4
6	If a Process that is stationary to all orders $n=1,2,3,\dots,N$, is called a a) Strict sense stationary b) Wide sense stationary c) First order stationary d) Independent.	CO4
7	Two independent Random Variables are ---- Random Variables. a) correlated b) uncorrelated c) marginal d) none	CO4
8	The maximum value of auto-correlation function occurs at a) $\tau=0$ b) $\tau=1$ c) $\tau=\infty$ d) none	CO4
9	The auto-correlation function of an energy signal has a) no symmetry b) conjugate symmetry c) odd symmetry d) even symmetry	CO4
10	The ACF of a rectangular pulse of duration T is a) a rectangular pulse of duration T b) a rectangular pulse of duration 2T	CO4

c) a triangular pulse of duration T	
d) a triangular pulse of duration 2T	

Assignment:

Topic Name: Bayes theorem and Total Probability (10M)

S.No	Question	CO Addressed
1	Generate Gaussian noise and calculate its mean, mean square value, Skew and its kurtosis. (Using MATLAB)	CO5
2	Generate Rayleigh distribution function CDF and pdf plots without using inbuilt commands. (Using MATLAB)	CO5

Final Evaluation Sheet for Assignment Marks:

Section A:

S.No.	H.T.No.	Assignment (10M)	Quiz1 (10M)	Quiz2 (10M)	Group problem Solving (10M)	Average (10M)
1	18K41A0401	10	10	10	9	9.75
2	18K41A0402	10	8	10	9	9.25
3	18K41A0403	10	0	9	9	7
4	18K41A0404	10	8	10	8	9
5	18K41A0405	10	0	9	9	7
6	18K41A0406	10	0	10	7	6.75
7	18K41A0407	10	8	9	8	8.75
8	18K41A0409	10	10	10	9	9.75
9	18K41A0410	10	10	9	8	9.25
10	18K41A0411	10	8	10	7	8.75
11	18K41A0412	10	0	8	8	6.5
12	18K41A0413	10	4	10	4	7
13	18K41A0414	10	4	4	4	5.5
14	18K41A0415	10	10	10	7	9.25
15	18K41A0416	10	8	10	0	7
16	18K41A0417	4	4	9	4	5.25
17	18K41A0418	10	0	9	9	7
18	18K41A0419	10	0	9	8	6.75
19	18K41A0420	10	8	10	7	8.75
20	18K41A0421	8	10	10	9	9.25

21	18K41A0422	10	0	10	9	7.25
22	18K41A0423	10	10	10	10	10
23	18K41A0424	4	4	9	7	6
24	18K41A0425	4	4	10	9	6.75
25	18K41A0426	10	4	8	9	7.75
26	18K41A0427	4	10	8	8	7.5
27	18K41A0428	10	10	10	8	9.5
28	18K41A0429	0	10	10	7	6.75
29	18K41A0430	10	0	9	8	6.75
30	18K41A0431	0	8	10	7	6.25
31	18K41A0432	10	10	10	7	9.25
32	18K41A0433	10	0	10	9	7.25
33	18K41A0434	10	4	10	0	6
34	18K41A0435	10	10	10	7	9.25
35	18K41A0436	10	10	10	10	10
36	18K41A0437	10	0	10	5	6.25
37	18K41A0438	10	0	9	7	6.5
38	18K41A0439	9	0	10	7	6.5
39	18K41A0440	10	10	10	9	9.75
40	18K41A0441	4	4	10	9	6.75
41	18K41A0442	10	10	0	4	6
42	18K41A0443	10	0	10	7	6.75
43	18K41A0444	4	6	10	4	6
44	18K41A0445	10	10	10	9	9.75
45	18K41A0446	10	10	10	5	8.75
46	18K41A0447	4	6	9	5	6
47	18K41A0448	10	10	10	5	8.75
48	18K41A0449	10	6	10	10	9
49	18K41A0450	4	8	10	8	7.5
50	18K41A0451	4	4	10	4	5.5
51	18K41A0452	10	10	8	9	9.25
52	18K41A0453	10	0	10	9	7.25
53	18K41A0454	10	10	10	7	9.25
54	18K41A0455	4	2	10	10	6.5
55	18K41A0456	10	10	10	8	9.5
56	18K41A0457	9	10	10	4	8.25
57	18K41A0458	9	10	10	5	8.5
58	18K41A0459	4	2	10	10	6.5
59	18K41A0460	4	2	10	4	5
60	19K45A0401	10	10	8	7	8.75
61	19K45A0402	10	10	10	4	8.5

62	19K45A0403	10	10	10	0	7.5
63	19K45A0404	10	8	10	0	7
64	19K45A0405	9	10	10	0	7.25
65	19K45A0406	0	8	9	7	6
66	19K45A0407	9	10	10	0	7.25

Section B:

S.No.	H.T.No.	Assignment (10M)	Quiz1 (10M)	Quiz2 (10M)	Group problem solving(10M)	Average
1	18K41A0461	10	10	8	10	9.5
2	18K41A0462	10	10	4	10	8.5
3	18K41A0463	0	0	0	10	2.5
4	18K41A0464	10	8	10	10	9.5
5	18K41A0465	0	10	9	10	7.25
6	18K41A0466	10	10	9	9	9.5
7	18K41A0467	10	6	10	6	8
8	18K41A0468	10	0	10	10	7.5
9	18K41A0469	4	2	4	10	5
10	18K41A0470	10	8	10	10	9.5
11	18K41A0471	0	10	9	6	6.25
12	18K41A0472	10	8	10	10	9.5
13	18K41A0473	10	0	8	10	7
14	18K41A0474	8	8	10	6	8
15	18K41A0475	4	4	4	10	5.5
16	18K41A0476	10	8	10	9	9.25
17	18K41A0477	0	0	0	0	0
18	18K41A0478	4	4	7	9	6
19	18K41A0479	10	0	10	9	7.25
20	18K41A0480	10	10	10	10	10
21	18K41A0481	10	10	10	10	10
22	18K41A0482	10	8	10	10	9.5
23	18K41A0483	0	10	8	6	6
24	18K41A0484	8	10	7	9	8.5
25	18K41A0485	4	10	0	10	6

26	18K41A0486	4	10	8	6	7
27	18K41A0487	4	10	8	4	6.5
28	18K41A0488	0	8	9	10	6.75
29	18K41A0489	4	4	8	9	6.25
30	18K41A0490	10	10	8	10	9.5
31	18K41A0491	10	0	10	9	7.25
32	18K41A0492	8	8	0	10	6.5
33	18K41A0493	4	4	10	6	6
34	18K41A0494	6	4	4	6	5
35	18K41A0495	4	4	10	9	6.75
36	18K41A0496	8	4	7	4	5.75
37	18K41A0497	8	10	10	10	9.5
38	18K41A0498	8	10	10	10	9.5
39	18K41A0499	10	8	9	9	9
40	18K41A04A0	10	8	8	10	9
41	18K41A04A1	10	10	10	9	9.75
42	18K41A04A2	0	0	0	0	0
43	18K41A04A3	4	4	10	9	6.75
44	18K41A04A4	10	8	0	9	6.75
45	18K41A04A5	10	4	4	6	6
46	18K41A04A6	6	4	6	9	6.25
47	18K41A04A7	0	10	9	10	7.25
48	18K41A04A8	10	4	4	6	6
49	18K41A04A9	8	4	9	6	6.75
50	18K41A04B0	4	4	8	4	5
51	18K41A04B1	10	0	9	9	7
52	18K41A04B2	10	8	9	10	9.25
53	18K41A04B3	4	4	10	6	6
54	18K41A04B4	9	0	9	10	7
55	18K41A04B5	0	10	9	10	7.25
56	18K41A04B6	10	8	10	9	9.25
57	18K41A04B7	10	8	9	9	9
58	18K41A04B8	0	8	9	10	6.75
59	18K41A04B9	0	0	0	0	0
60	18K41A4C0	9	8	9	6	8
61	19K45A0408	9	8	10	6	8.25
62	19K45A0409	10	8	0	7	6.25
63	19K45A0410	10	6	0	8	6
64	19K45A0411	8	6	4	7	6.25
65	19K45A0412	4	4	9	6	5.75
66	19K45A0413	8	6	7	6	6.75

Section C:

Roll no	Assignment (10)	Quiz 1 (10)	Group problem solving (10)	Quiz 3 (10)	Total (40)	Average
18K41A04C1			0		0	0
18K41A04C2	5	10	6	10	31	8
18K41A04C3	8	10	0	10	28	7
18K41A04C4	10	5	9	10	34	9
18K41A04C5	10	8	9	9	36	9
18K41A04C6	10	9	6	10	35	9
18K41A04C7	10	8	6	10	34	9
18K41A04C8	10	10	6	10	36	9
18K41A04C9	10	10	10	10	40	10
18K41A04D0		10	6	10	26	7
18K41A04D1		10	6	10	26	7
18K41A04D2	2	10	0	10	22	6
18K41A04D3		6	10	10	26	7
18K41A04D4	10	10	9	10	39	10
18K41A04D5	10	8	9	10	37	9
18K41A04D6	10		9	10	29	7
18K41A04D7	10	10	10	10	40	10
18K41A04D8	10		10	10	30	8
18K41A04D9	10	10	9	10	39	10
18K41A04E0	10	10	10	10	40	10
18K41A04E1		10	10	10	30	8
18K41A04E3	2	8	10	10	30	8
18K41A04E4	8	10	10	10	38	10
18K41A04E5	10	10	10	10	40	10
18K41A04E6		10	10	10	30	8
18K41A04E7		10	6	10	26	7
18K41A04E8	10	7	9	10	36	9
18K41A04E9	10	8	6	10	34	9
18K41A04F0	2	3	10	3	18	5
18K41A04F1	10	10	9	10	39	10
18K41A04F2	8	7	4	10	29	7
18K41A04F3		9	9	10	28	7

18K41A04F4	10	5	6	10	31	8
18K41A04F5	2	10	0	10	22	6
18K41A04F6	10	10	9	10	39	10
18K41A04F7	10	8	9	10	37	9
18K41A04F8	4	2	2	10	18	5
18K41A04F9	10	9	10	7	36	9
18K41A04G0	10	10	4	10	34	9
18K41A04G1	10	9	4	10	33	8
18K41A04G2	8	8	10	10	36	9
18K41A04G3	10	9	4	10	33	8
18K41A04G4	10	9	9		28	7
18K41A04G5	8	8	9	10	35	9
18K41A04G6	4		4	10	18	5
18K41A04G7	6	9	4	10	29	7
18K41A04G8	10	10	6	10	36	9
18K41A04G9	10	9	6	10	35	9
18K41A04H0	10	8	9	10	37	9
18K41A04H1		10	10	10	30	8
18K41A04H3		8	9	10	27	7
18K41A04H4	10	9	9	10	38	10
18K41A04H5	0	8	0	10	18	5
18K41A04H6	10		0	10	20	5
19K45A0414	8	7	9	10	34	9
19K45A0415	8	7	9	10	34	9
19K45A0416	7	8	9	10	34	9
19K45A0417	8	7	9	10	34	9
19K45A0418	7	8	9	5	29	7
19K45A0419	8	7	9	10	34	9
19K45A0420	7	8	9	10	34	9
19K45A0421	8	7	9	10	34	9
19K45A0422	8	7	9	10	34	9
17K41A0438	5	4	5	4	18	5
17K41A04F5	4	6	5	6	21	5
17K41A04F3	6	5	6	6	23	6