L.J Institute of Engineering and Technology, Ahmedabad.
Introduction to Probability Theory and Stochastic Processes Practice Book
(Sem- III)

Note: This practice book is only for reference purpose. LJU Test question paper may not be completely set from this practice book.

Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
1	1	What are the chances that no two boys are sitting together for a photograph if there are 5 girls and 2 boys?	5/7	1		1/21	4/7	2/7	5/7
2	1	An event in the probability that will never be happened is called as -	Impossible event	1		Unsure event	Sure event	Possible event	Impossible event
3	1	What will be the probability of getting odd numbers if a die is thrown?	1/2	1		1/2	2	4/2	5/2
4	1	What is the probability of getting a sum as 3 if two dice are thrown?	1/18	1		2/18	1/18	4	1/36
5	1	What is the probability of getting the sum as a prime number if two dice are thrown?	5/12	1		5/24	5/12	5/30	1/4
6	1	If two dice are thrown together, what is the probability of getting an even number on one dice and an odd number on the other dice?	1/2	1		1/4	3/5	3/4	1/2
7	1	When two coins are tossed simultaneously, what are the chances of getting at least one tail?	3/4	1		3/4	1/5	4/5	1/4
8	1	A coin and a dice are tossed consecutively. What is the probability to get a 6 on a dice given that a head on a coin?	1/12	1	LJU - 2023	1/12	1/4	1/3	NONE
9	1	What is the possibility of having 53 Thursdays in a non-leap year?	1/7	1		6/7	1/7	1/365	53/365
10	1	Three unbiased coins are tossed. What is the probability of getting at least 2 tails?	0.5	1		0.75	0.5	0.25	0.2
11	1	Probability of getting a sum 5 on the top of the dice is $1/36$. How many times a dice is rolled?	3	1	LJU - 2023	2	4	3	NONE
12	1	Two friends A and B apply for a job in the same company. The chances of A getting selected is 2/5 and that of B is 4/7. What is the probability that both of them get selected?	8/35	1		8/35	34/35	27/35	None of these
13	1	A dice is rolled twice. What is the probability of getting sum 9?	1/9	1		2/3	1/3	1/9	3/9
14	1	If A and B are two events such that $P(A) = \frac{1}{7}, P(B) = \frac{1}{5}$ and $P(A \cup B) = \frac{11}{35}$ then A and B are which type of event?	Independent Event	1		Mutually Equal event	Independent Event	Exhaustive events	a) and c) both
15	1	Students likes either mathematics or physics. 65% likes physics and 25% likes both the subjects. What is the probability that who likes mathematics also likes physics.	5/13	1	LJU-2023	5/12	5/13	12/13	NONE
16	1	If a number is selected at random from the first 50 natural numbers, what will be the probability that the selected number is a multiple of 3 and 4?	2/25	1		7/50	4/25	2/25	3/25
17	1	An urn contains 9 balls, two of which are red, three blue and four black. Three balls are drawn at random. The chance that they are of the same color is	5/84	1		5/84	7/84	3/9	4/9
18	1	A and B are two independent events such that $P(\bar{A}) = 0.7, P(\bar{B}) = k$ and $P(A \cup B) = 0.8,$ then k is	2/7	1		2/7	5/7	6/7	1
19	1	The probability that Jay will solve a problem is 2/3 and the probability that Vijay will solve it is 3/4. What is the probability that the problem will be solved.	11/12	1		11/12	11/24	1/12	1/6
20	1	3 people A, B and C are sitting in a circular fashion. Find the probability that A and B do not sit together.	0	1		1	0	0.5	0.33
21	1	If four dice are thrown together, the probability that the sum of the numbers appearing on them is 13 is,	$\frac{35}{324}$	1		$\frac{7}{108}$	$\frac{23}{324}$	$\frac{35}{1296}$	$\frac{35}{324}$
22	1	What will be the probability of an impossible event?	0	1		0	1	Infinity	None of the above
23	1	What will be the number of events if 10 coins are tossed simultaneously?	1024	1		512	90	1000	1024
24	1	A, B, and C are three mutually and Exhaustive event P(A)= 2P(B)= 6P(C). Find P(B).	0.3	1		0.1	0.3	0.6	0.4
25	1	A box contains 5 red and 10 green balls. Eight (8) of them are placed with another box. The chances that the letter box contains 2 red and 6 green balls are ___.	140/429	1		240/429	140/367	140/429	240/367

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26	1	A box Contain 20 defective and 80 non-defective items. If two items are selected at random without replacement. What will be the probability that both items are defective?	19/495	1		1/5	1/25	20/99	19/495
27	1	As per De Morgan's Law, (A ∩ B)' is equal to	A' ∪ B'	1		A' ∩ B'	A' ∪ B'	(A ∩ B)'	A' + B'
28	1	As per De Morgan's Law, (A ∪ B)' is equal to	A' ∩ B'	1		A' ∩ B'	A' ∪ B'	(A ∩ B)'	A' + B'
29	1	If E and F are two events associated with the same sample space of a random experiment then P (E|F) is given by _____	P(E∩F) / P(F), provided P(F) ≠ 0	1		P(E∩F) / P(F), provided P(F) ≠ 0	P(E∩F) / P(F), provided P(F) = 0	P(E∩F) / P(F)	P(E∩F) / P(E)
30	1	Let E and F be events of a sample space S of an experiment, if P(S|F) = P(F|F) then value of P(S|F) is _____	1	1		0	-1	1	2
31	1	Given that E and F are events such that P(E) = 0.6, P(F) = 0.3 and P(E∩F) = 0.2, then P(E|F)?	2/3	1		2/3	1/3	3/4	1/4
32	1	If P(A) = 7/11, P(B) = 6 / 11 and P(A∪B) = 8/11, then P(A|B) = _____	5/6	1		3/5	2/3	1/2	5/6
33	1	If P(A) = 1/5, P(B) = 0, then what will be the value of P(A|B)?	Not defined	1		0	1	Not defined	1/5
34	1	Which of this represents the multiplication theorem of probability?	P(A∩B) = P(A) P(B/A)	1		P(A∩B) = P(B) P(B/A)	P(A∩B) = P(A) P(B/A)	P(A∩B) = P(A) P(B/B)	P(A∩B) = P(A) P(A/A)
35	1	What is the probability that a 5 digits number using 0, 2, 4, 6 and 8 without repeating which is a multiple of 4?	11/24	1	LJU-2023	5/12	7/12	11/24	NONE
36	1	A person is known to hit the target in 3 out of 4 shots, whereas another person is known to hit the target in 2 out of 3 shots. What is the Probability of Target being hit at all when they both try?	0.9167	1		0.0833	0.9167	0.25	0.3333
37	1	There are 4 red pencils,5 blue pencils, 3 yellow pencils, and 10 white pencils in a bag. What is the probability of getting a pencil that is red or blue?	$\frac{9}{22}$	1	LJU-2022	$\frac{9}{22}$	$\frac{13}{22}$	$\frac{8}{22}$	$\frac{7}{22}$
38	1	In a group of 100 computer buyers, 40 bought CPU, 30 purchased monitor, and 20 purchased CPU and monitors. If a computer buyer chose at random and bought a CPU, what is the probability they also bought a Monitor?	0.5	1		0	1	0.5	0.3
39	1	You are making a sub. You have 4 choices of meat, 3 choices of cheese,6 choices of vegetables and 4 different dressings. How many different subs are possible for you to make, if you are allowed one from each category?	288	1		288	388	480	399
40	1	You are making a password. The password must consist of 3 letters followed by 3 digits. All letters and digits are permitted and repetition of the letter and digits are allowed. How many different passwords are possible?	17576000	1		178500	1788200	1875570	17576000
41	1	A bag contains 10 red marbles,5 blue marbles and 8 yellow marbles. What is the probability of choosing a marble which is not yellow?	$\frac{15}{23}$	1		$\frac{18}{23}$	$\frac{15}{23}$	$\frac{13}{23}$	$\frac{8}{23}$
42	1	Two dice are rolled. What is the probability of getting an even number on the first die and a 2 on second die?	$\frac{1}{12}$	1		$\frac{1}{2}$	$\frac{1}{6}$	$\frac{1}{12}$	$\frac{3}{12}$
43	1	Each of ten tickets is marked with a different number from 0 to 9 and put into a box. If you draw a ticket from the box, what is the probability that you will draw a 2 or 8 or 4?	$\frac{3}{10}$	1		$\frac{3}{10}$	$\frac{1}{10}$	$\frac{2}{10}$	$\frac{8}{10}$
44	1	Bag A contains 12 blue marbles and 5 red marbles. Bag B contain 7 orange marbles and 5 grey marbles. Find the probability of selecting a red marble from bag A and an orange marble from bag B in one draw from each bag.	$\frac{35}{204}$	1		$\frac{204}{35}$	$\frac{7}{35}$	$\frac{35}{204}$	$\frac{12}{204}$
45	1	The probability that it will be sunny on Friday is 4/5. The probability that an ice cream shop will sell ice creams on a sunny Friday is 2/3 and the probability that the ice cream shop sells ice creams on a non-sunny Friday is 1/3. Then what are the probability that it will be sunny and the ice cream	$\frac{8}{15}$	1		$\frac{8}{15}$	$\frac{15}{8}$	$\frac{11}{15}$	$\frac{9}{15}$

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		shop sells the ice creams on Friday?							
46	1	If 12 persons are seated at a round table, what is the probability that two particular persons sit together?	$^2/_{11}$	1		$^2/_{11}$	$^1/_{11}$	$^1/_{12}$	$^5/_{12}$
47	1	If a fair die is rolled twice, observe the numbers that face up. Find the conditional probability that the sum of the numbers is 7, given that the first number is 2.	$\frac{1}{6}$	1		$\frac{6}{7}$	$\frac{8}{7}$	$\frac{7}{6}$	$\frac{1}{6}$
48	1	70% of your friends like Chocolate, and 35% like Chocolate AND like Strawberry. What percent of those who like Chocolate also like Strawberry?	50%	1	LJU-2022	20%	40%	50%	45%
49	1	Consider the following equations I : Two events are Mutually exclusive if the occurrence of one event prevents the occurrence of the other II : If A and B are two mutually exclusive event with $P(A) = \frac{1}{3}$ and $P(B) = \frac{1}{4}$, then $P(\bar{A} \cap \bar{B}) is \frac{5}{12}$ Which of the above statements is/are correct?	Both I and II	1		Only I	Only II	Both I and II	None
50	1	Company A product 10% defective products, Company B produces 20% defective products and Company C produces 5% defective Products. If we choosing a company is an equally like event, then what is the probability that product chosen is defective?	0.12	1	LJU-2022	0.22	0.12	0.11	0.21
51	1	The probability that a person stopping at a gas station will ask to have his tires checked 0.12, probability that he will ask to have his oil checked is 0.29and probability that he will ask to them both checked is 0.07. The probability that a person who has his tries checked will also have oil checked is	0.58	1		0.34	0.58	0.24	0.41
52	1	In given day in the rainy season, it may rain 70 % of the time. If it rains, chances that a village fair will make a loss on that day is 80%. However, if it does not rain, chance that the fair will make a loss on that day is only 10%. If the fair has not made a loss on a given day in the rainy season, what is the probability that it has not rained on that day?	$\frac{27}{41}$	1		$\frac{27}{41}$	$\frac{3}{10}$	$\frac{9}{11}$	$\frac{14}{17}$
53	1	Let A and B be two events such that $P(\overline{A \cup B}) = \frac{1}{6}$, $P(A \cap B) = \frac{1}{4}, P(\bar{A}) = \frac{1}{6}$, where $\bar{A}$ stands for complement of event Then, events A and B are:	Independent but not equally likely	1		Equally likely but not independent	Mutually exclusive and independent	Independent but not equally likely	Equally likely and mutually exclusive
54	1	If A and B be two arbitrary events, then	$P(A \cup B) \leq P(A) + P(B)$	1		$P(A \cap B) = P(A) \cdot P(B)$	$P(A \cup B) = P(A) + P(B)$	$P(A/B) = P(A \cap B)P(B)$	$P(A \cup B) \leq P(A) + P(B)$
55	1	If two fair coins are flipped and at least one of the outcomes is known to be head, what is the probability that both outcomes are heads?	$\frac{1}{3}$	1	LJU-2022	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{2}{3}$	$\frac{1}{3}$
56	1	15 numbered cards are there from 1 to 15, and two cards a chosen at random such that the sum of the numbers on both the cards is even. Find the probability that the chosen cards are odd-numbered.	NONE	1	LJU - 2023	2/27	1/24	3/17	NONE
57	1	In a certain residential suburb, 60% of all household s get internet service from the local cable company, 80% get television service from that company, and 50% get both services from that company. If a household is randomly selected, what is the probability that it gets at least one of these services from the company?	0.9	1		0.5	0.6	0.9	None of these
58	1	The probability that a randomly selected person has high blood pressure (the event H) is $P(H) = 0.2$ and the probability that a randomly selected person is a runner (the event R) is $P(R) = 0.3$.The probability that a randomly selected person has high blood pressure and is a runner is 0.1. What is the probability that a randomly selected person has high blood pressure and is not a runner?	0.1	1		0.2	0.3	0.5	0.1
59	1	Using the digits 1, 2, 3, 4, and 5, a number having five digits is formed without any repetition. What is	0.2	1		0.34	0.2	0.58	0.44

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		the probability that the number is divisible by 4?							
60	1	If A and B are two independent events, then the probability of occurrence of at least of A and B is given by	$1 - P(\bar{A}) \cdot P(\bar{B})$	1		$P(A) \cdot P(B)$	$1 - P(\bar{A}) \cdot P(\bar{B})$	0	$1 - P(A) \cdot P(\bar{B})$
61	1	A man is known to speak truth 2 out of 3 times. He throws a die and report that number obtained is a four. Find the Probability that the number obtained is actually a four.	2/7	1	LJU-2022	1/14	2/7	3/7	5/7
62	1	Find P(E|F), where E: no tail appears, F: no head appears, when two coins are tossed in the air.	0	1		0	1	2	3
63	1	The chances of a defective screw in the three boxes A, B, C are 1/5, 1/6 and 1/7 respectively. A box is selected at random and a screw drawn from it at random is found to be defective. Find the probability that it came from box A.	42/107	1	LJU-2022	40/107	41/107	42/107	43/107
64	1	The Probability that India wins a cricket test match against England is $\frac{1}{3}$. If India and England play **3** matches, the probability that India will win at least one match is	$\frac{19}{27}$	1		$\frac{8}{27}$	$\frac{19}{27}$	$\frac{9}{27}$	$\frac{5}{27}$
65	1	If six dice are rolled, then the probability that all show different face is	$\frac{6!}{6^6}$	1		$\frac{1}{6^6}$	$\frac{6!}{6^6}$	$\frac{1}{2^6}$	$\frac{6}{6^6}$
66	1	The letters of the word 'article' are arranged at random then the probability that the vowels may occupy the even places is _____.	$\frac{1}{35}$	1		$\frac{1}{35}$	$\frac{3}{35}$	$\frac{4}{35}$	$\frac{12}{35}$
67	1	Four dice are thrown simultaneously. What will be the probability that all of them have the same face?	1/216	1		1/36	1/216	1/316	1/6
68	1	A single letter is selected at random from the word 'probability'. The probability that it is a vowel is	4/11	1		0	4/11	7/11	1
69	1	In a bucket there are 5 purple, 15 grey and 25 green balls. If the ball is picked up randomly, find the probability that it is neither grey nor purple?	5/9	1		5/9	12/13	51/43	2/7
70	1	The probabilities that a student will solve Question A and Question B are 0.4 and 0.5 respectively. What is the probability that he solves at least one of the two questions?	0.7	1		0.6	0.7	0.8	0.9
71	1	Let A and B be two events with $P(A) = \frac{3}{8}$, $P(B) = \frac{5}{8}, P(AUB) = \frac{3}{4}$. Find P(A/B) and P(B/A)		3					
72	1	An urn contains 10 white and 3 black balls, while another urn contains 3 white and 5 black balls. Two balls are drawn from the first urn and put into the second urn and then a ball is drawn from the latter. What is the probability that it is a white ball?		4					
73	1	Find the probability of drawing a queen and a king from a pack of cards in two consecutive draws, the cards drawn not being replaced.		3					
74	1	In a certain assembly plant, three machines, B1, B2, and B3, make 30%, 45%, and 25%, respectively, of the products. It is known from past experience that 2%, 3%, and 2% of the products made by each machine, respectively, are defective. Now, suppose that a finished product is randomly selected. What is the probability that it is defective?		4					
75	1	Three boxes contain 10%, 20% and 30% of defective finger joints. A finger joint is selected at random which is defective. Determine the probability that it comes from (i) 1st box (ii) 2nd box (iii) 3rd box		4					
76	1	What is the chance that a leap year selected at random will contain 53 Sundays?		3					
77	1	In tossing 3 balanced coins, what is the probability of getting 2 heads?		2					
78	1	Compute $P(A/B), If\ P(A) = 0.6,\ P(B) = 0.7\ and\ P(A \cap B) = 0.3$		2					

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79	1	In a box, 100 bulbs are supplied out of which 10 bulbs have defects of type A, 5 bulbs have defects of type B and 2 have defects of both types. Find the probabilities that a bulb to be drawn at random has a B type defect under the condition that it has an A type defect.		3					
80	1	One shot is fired from each of the three guns. E_1, E_2, E_3 denotes the events that the target is hit by the first, second and third guns respectively. If $P(E_1) = 0.5, P(E_2) = 0.6$ and $P(E_3) = 0.8$ and E_1, E_2, E_3 are independent event. Find the probability that exactly one hit is registered.		3					
81	1	Two students x and y work independently on a problem. The probability that x will solve it is 3/4 and the probability that y will solve it is 2/3. What is the probability that problem will be solved?		2					
82	1	There are two bags. The first contains 2 red and 1 white ball, whereas the second bag has only 1 red and 2 white balls. One ball is taken out at random from the first bag and put in second. Then a ball is chosen at random from the second bag. What is the probability that this last ball is red?		4					
83	1	A bag contains 2 black, 3 red, and 5 blue balls. Three balls are drawn at random. Find the probability that the three balls drawn: (1) are blue (2) consist of 2 blue and 1 red ball, and (3) consist of exactly one black ball.		3					
84	1	Probability of solving specific independently by A and B are $\frac{1}{2}$ and $\frac{1}{3}$ respectively. If both try to solve the problem independently, find the probability that (i) the problem is solved (ii) exactly one of them solves the problem.		3					
85	1	From the employees of a company 5 persons are selected to represent them in the managing committee of the company. Particulars of five persons are as follows: Sr.No | Name | Sex | Age in years 1 | Harish | M | 30 2 | Rohan | M | 33 3 | Sheetal | F | 46 4 | Alis | F | 28 5 | Salim | M | 41 A person is selected at random from this group to act as a spokesperson. What is the probability that the spokesperson will be either male or over 35 years?		3					
86	1	In the manufacture of light bulbs, filaments, glass casings and bases are manufactured separately and then assembled into final product. From past records we know that 2% of all the filaments are defective, 3% of all glass casings are defective, 1% all the bases are defective. What is the probability that a bulb randomly selected is defective?		3					
87	1	State Bayes' theorem. In a bolt factory, three machines A, B and C manufacture 25%, 35%and 40% of the total product respectively. Of these outputs 5%, 4% and 2% respectively, are defective bolts. A bolt is picked up at random and found to be defective. What are the probabilities that it was		4					

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		manufactured by machines A, B and C?							
88	1	A factory produces a certain type of outputs by three types of machines. The respective daily production figures are: Machine I: 3000 Units; Machine II: 2500 Units; Machine III: 4500 Units Past experience shows that 1 Per cent of the output produced by Machine I is defective. The corresponding fraction of defectives for the other two machines are 1.2 Per cent and 2 Per cent respectively. An item is drawn at random from the day's production run and is found to be defective. What is probability that it comes from the output of Machine II?		3					
89	1	It is observed that 50% of mails are spam. There is a software that filters spam mail before reaching the inbox. Its accuracy for detecting a spam mail is 99% and chances of tagging a non-spam mail as spam mail is 5%. If a certain mail is tagging as spam find the probability that it is not a spam mail.		4	LJU-2023				
90	1	Explain Bay's rule for probability. Three boxes contained 10%, 20% and 30% red colors pens. A pen is selected at random whose color is red. Determine the probability that it came from 3rd box, 2nd box, 1st box.		4					
91	1	An aircraft emergency locator transmitter (ELT) is a device designed to transmit a signal in the case of crash. The Altigauge Manufacturing company makes 80% of the ELTs, the Bryant company makes 15% of them, and the Chartair company makes the order 5%. The ELTs made by Altigauge have a 4% rate of defects, the Bryant ELTs have a 6% rate of defects, and Chartair have 9% defects. (1) If a randomly selected ELT is then tested and found to be defective, find the probability that it was made by the Chartair manufacturing company. (2) If a randomly selected ELT is then tested and is found to be defective, find the probability that it was made by the Altigauge Manufacturing company.		4					
92	1	A card is lost from a pack of 52 cards. From the remaining cards two are drawn randomly and found to be both clubs. Find the probability that the lost card is also a club.		3					
93	1	There are 3 boxes, the first one containing 1 white, 2 red and 3 black balls; the second one containing 2 white, 3 red and 1 black ball and the third one containing 3 white, 1 red and 2 black balls. A box is chosen at random and from it two balls are drawn at random. One ball is red and the other, white. What is the probability that they come from the second box?		4					
94	1	A class consists of 6 girls and 10 boys. If a committee of three is chosen at random from the class, find the probability that, (i) three boys are selected; (ii) exactly two girls are selected.		3					
95	1	In producing screws, let A mean "screw too slim" and B "screw too short". Let P(A) = 0.1 and let the conditional probability that a slim screw is also too small be P(B/A) = 0.2. What is the probability that the screw that we pick randomly from the lot produced will be both too slim and too short?		3					
96	1	Define conditional probability. A bag contains 19 tickets numbered from 1 to 19. Two tickets are drawn successively without replacement. Find the probability that both tickets will show even number?		3					
97	1	If A and B are independent events with $P(A) = 0.26$, and $P(B) = 0.45$, find (a) $P(A \cap B)$; (b) $P(A \cap \bar{B})$; (c) $P(\bar{A} \cap \bar{B})$.		3					
98	1	A room has three lamp sockets. From a collection of 10 light bulbs of which only 6 are good. A		3					

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		person selects 3 at random and puts them in the socket. What is the probability that the room will have light?							
99	1	If 3 balls are "randomly drawn" from a bowl containing 6 white and 5 black balls. What is the probability that one of the balls is white and the other two black?		3					
100	1	A microchip company has two machines that produce the chips. Machine I produce 65% of the chips, but 5% of its chips are defective. Machine II produces 35% of the chips and 15% of its chips are defective. A chip is selected at random and found to be defective. What is the probability that it came from Machine I?		4					
101	1	A factory has two machines, A and B. Past records show that the machine A produce 30% of the total output and the machine B, the remaining 70%. Machine A produces 5% of defective items and Machine B produce 1% defective items. An item is drawn at random and found to be defective. What is the probability that it was produced by (i) the machine A, and (ii) the machine B?		3	LJU-2022				
102	1	A businessman goes to hotels X, Y, Z for 20%, 50%, 30% of the time respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faulty plumbing. What is the probability that the businessman's room having faulty plumbing is assigned to (1) Hotel X (2) Hotel Y (3) Hotel Z		3					
103	1	Four cards are drawn from a pack of cards. Find the probability that (i)all are diamonds, (ii) there is one card of each suit, (iii) there are two spades and two hearts.		3					
104	1	If 6 of 18 new buildings in a city violate the building code, what is the probability that a building inspector, who randomly selects 4 of the new buildings for inspection, will catch (i)None, (ii) One, (iii) at least 3, of the new buildings that violate the building code?		4					
105	1	There are 5 yellow, 2 red and 5 white balls in the box. Three balls are randomly selected from the box. Find the probability of the following events. (1) All are of different colors (2) 2 yellow and 1 red color (3) All are of same color		4					
106	1	A problem in statistics is given to two students A and B. The odds in favour of A solving the problem are 6 to 9 and against B solving the problem are 12 to 10. If both A and B attempt, find the probability of the problem being solved.		3					
107	1	In a class of 75 students, 15 were considered to be very intelligent, 45 as medium and the rest below average. The probability that a very intelligent student fails in a viva-voce examination is 0.005; the medium student failing has a probability 0.05; and the corresponding probability for a below average student is 0.15. If a student is known to have passed the viva-voce examination, what is the probability that he is below average?		3	LJU-2023				
108	1	A problem in statistics is given to three students A, B and C, whose chances of solving it independently are 1/2, 1/3 and 1/4 respectively. Find the probability that (i) the problem is solved (ii) at least two of them are able to solve the problem (iii) exactly two of them are able to solve the problem		3	LJU-2022				
109	1	Suppose we have 3 cards identical in form except that both sides of the first card are colored red, both		3					

Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		sides of the second card are colored black, and one side of the third card is colored red and the other side is colored black. The 3 cards are mixed up in a hat, and 1 card is randomly selected and put down on the ground. If the upper side of the chosen card is colored red, what is the probability that the other side is colored black?							
110	1	In a group of 1000 persons, there are 650 who can speak Hindi, 400 can speak English, and 150 can speak both Hindi and English. If a person selected at random, what is the probability that he speaks (1) Hindi only, (2) English only, (3) at least one of the two languages?		3					
111	1	(i) An unbiased coin is tossed 3 times. What is the probability of obtaining two heads? (ii) A 4-sided fair die is thrown twice. What is the probability that the sum of the two outcomes is equal to 6?		2					
112	1	A problem in statistics is given to three students A, B and C. Whose chances of solving are $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{4}$ respectively. What is the probability that the problem will be solved if all of them try independently?		3					
113	2	A random variable is also called	Chance Variable	1		Constant	Variable	Attribute	Chance Variable
114	2	Suppose, four coins are tossed, the value of a random variable H (No. of heads) is:	0,1,2,3,4	1		1,2,3,4	0,1,2,3,4	0,1,2,3	0,1
115	2	The sum of probabilities of a discrete random variable is	One	1		Zero	Four	Three	One
116	2	A random variable assuming only a finite number of values is called:	Discrete random variable	1		Discrete random variable	Continuous random variable	Random variable	None of these
117	2	A random variable assuming an infinite number of values is called	Continuous random variable	1		Absolute variable	Discrete random variable	Continuous random variable	None of these
118	2	If X and Y are random variables then E(X+Y) is equal to	E(X)+E(Y)	1		E(X)+E(Y)	E(X)-E(Y)	E(X)+Y	None of these
119	2	A variable which can assume each and every value within a given range is called	Continuous variable	1		Discrete variable	Random variable	Qualitative variable	Continuous variable
120	2	A random variable X has the Probability density function given by $f(x) = kx^2 + x, 0 \le x \le 1$. The value of k is	3/2	1		3/2	2	2/3	1
121	2	A fair die is tossed thrice. If the probabilities of zero, one, two and three successes are 8/27, 4/9, 2/9 and 1/27 respectively. Find the mean of the number of successes	1	1	LJU-2022	1/2	1	2/3	3/4
122	2	The probability distribution of a random variable X is given by X: -2, -1, 0, 1, 2, 3 P(X=x): 0.1, 0.1, 0.2, 0.2, 0.3, 0.1 Find mean.	0.8	1		0	0.2	0.8	1
123	2	For which value of k the function $P(X = x) = k(x^2 + 1),\ x = 0,1,2,3$ can be considered as probability mass function	1/18	1		1/9	1/18	2/9	-1/18
124	2	Find the value of the λ such that the function f(x) is a valid probability density function $f(x) = \lambda(x-1)(2-x), \quad 1 \le x \le 2$ = 0, Otherwise	6	2	LJU-2022	6	5	1	4
125	2	A continuous random variable X has the pdf $f(x) = \frac{k}{1+x^2},\ -\infty < x < \infty$ then find k.	$1/\pi$	1		$1/\pi$	$2/\pi$	$3/\pi$	$\pi/2$
126	2	Let X be a continuous random variable denoting the temperature measured. The range of temperature is [0, 100] degree Celsius and let the probability density function of x be $f(x) = 0.01$ for	50.0	2		5.0	2.5	25.0	50.0

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		$0 \leq x \leq 100$. The mean of X is.							
127	2	Find the value of P(X=3). If x is the discrete random variable, Taking values x_1, x_2, x_3 $where\ P(X=0)=0, P(X=1)=1/4, P(X=2)=1/4$	1/2	1		1	1/2	1/3	1/4
128	2	A fair six-sided die is rolled, with X being the number on the uppermost face. The variance of X is…	35/12	1		35/6	35/12	25/12	25/6
129	2	What will be the value of P (not E) if P(E) = 0.07?	0.93	1		0.90	0.007	0.93	0.093
130	2	A probability density function f(x) for the continuous random variable X is denoted as _____	$\int f(x)dx = 1, -\infty \leq x \leq \infty$	1		$\int f(x)dx = \infty, -1 \leq x \leq 1$	$\int f(x)dx = 1, -\infty \leq x \leq \infty$	$\int f(x)dx = 0, -\infty \leq x \leq \infty$	$\int f(x+2)dx = 0.5 \quad -\infty \leq x \leq \infty$
131	2	In a card game Reena wins 3 Rs. if she draws a king or a spade and 7 Rs. if a heart or a queen from a pack of 52 playing cards. If she pays a certain amount of money each time she will lose the game. What will be the amount so that the game will come out a fair game?	8	1		15	6	8	2
132	2	A Random Variable X can take only two values, 4 and 5 such that P(4) = 0.32 and P(5) = 0.47. Determine the Variance of X.	3.7	1		8.21	12	3.7	4.8
133	2	A, B, and C are three mutually and Exhaustive event P(A)= 2P(B)= 6P(C). Find P(B).	0.3	1	LJU-2022 LJU - 2023	0.1	0.3	0.25	0.4
134	2	A fair cubical die is thrown twice and their scores summed up. If the sum of the scores of upper sides faces by throwing two times a die is an event. Find the Expected Value of that event.	7	1		48	76	7	132
135	2	A random variable X can take only two values, 2 and 4 i.e., P(2) = 0.45 and P(4) = 0.97. What is the Expected value of X?	4.78	1		3.8	2.9	4.78	5.32
136	2	Mean of a constant ‘a’ is _____	a	1		0	a	a/2	1
137	2	Variance of a constant ‘a’ is _____	0	1		0	a	a/2	1
138	2	Find the mean of a random variable X if f(x) = x – 5⁄2 for $0 < x < 1$ = 2x for $1 < x < 2$ = 0 otherwise.	3.75	1		3.5	3.75	2.5	2.75
139	2	The probability that it rains tomorrow is 0.72. Find the probability that it does not rain tomorrow?	28%	1		65%	43%	28%	32%
140	2	If E(x) = 2 and E(z) = 4, then E(z – x) =?	2	1		2	6	0	Insufficient data
141	2	A table with all possible value of a random variable and its corresponding probabilities is called _____	Probability Distribution	1		Probability Mass Function	Probability Density Function	Cumulative distribution function	Probability Distribution
142	2	What is the value of $E(2X-3)$ for given Probability distribution of a Random Variable X is given Below: <table><tr><td>X</td><td>−2</td><td>−1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>$P(X=x)$</td><td>0.2</td><td>0.1</td><td>0.3</td><td>0.3</td><td>0.1</td></tr></table>	−3			0	1	0.5	−3
143	2	A coin is tossed up 4 times. The probability that tails turn up in 3 cases is _____	1/4	1		1/2	1/3	1/4	1/6
144	2	A player tosses two fair coins. He wins 100Rs if a head appears and 200 Rs. If two heads appear. On the other hand, he loses 500 Rs. If no head appears. What is the expected value of the game?	-25 Rs.	1		25 Rs.	-25 Rs	100 Rs.	200 Rs.
145	2	Amit plays a game of tossing a dice. If a number less than 3 appears, he gets “a” Rs, otherwise he has to pay 10 Rs.if the game is fair, what is the value of “a”?	20	1		25	20	21	None of these
146	2	If a random variable X assumes the values 0 and 1 with $P(X=0)=3P(X=1)$, then $V(X)$ is _____	$\frac{3}{16}$	1		$\frac{1}{16}$	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{4}{16}$

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
147	2	The random variables X and Y have variances 0.2 and 0.5 respectively. Let $Z = 5X - 2Y$. The variance of Z is?	7	1	LJU-2023	2	5	7	NONE
148	2	Two t-shirts are drawn at random in succession without replacement from a drawer containing 5 red t-shirts and 8 white t-shirts. Find the probabilities of all the possible outcomes.		3					
149	2	A discrete random variable X has the following probability distribution $X = 0,1,2,3,4,5$ $P(X = k) = 0, k, 0.2, 2k, 0.3, 2k$ Find (i) k, (ii) $P(X < 3)$, (iii) $P(X \geq 3)$		4					
150	2	If is the function f(x) defined by $f(x) = \begin{cases} e^{-x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$ Is a probability density function. If so, find the probability that the variate having this density falls in the interval (1,2).		4					
151	2	Find the constant k such that the function $f(x) = \begin{cases} kx^2, 0 < x < 3 \\ 0, otherwise \end{cases}$ Is a probability density function and compute (i) k, (ii) $P(X < 2)$, (ii) $P(X \geq 2)$		4					
152	2	Is $f(x) = \frac{x}{6}$, $x = 0,1,2,3,4$ define probability distribution? Justify your answer.		3					
153	2	A machine produces on average of 500 items during the first week of the month and on average of 400 items during the last week of the month. The probability for these being 0.68 and 0.32. Determine the expected value of the production.		3					
154	2	The following table gives the probabilities that a certain computer will malfunction 0, 1, 2, 3, 4, 5 or 6 times on any one day: Number of malfunctions x: 0, 1, 2, 3, 4, 5, 6 Probability $f(x)$: 0.17, 0.29, 0.27, 0.16, 0.07, 0.03, 0.01 Find the mean and variance of this probability distribution.		4					
155	2	The life in hours of a certain kind of radio tube has the probability density $f(x) = \frac{100}{x^2}, \quad for\ x \geq 100$ $= 0, \quad$ elsewhere, find the distribution function and use it to determine the probability that the life of tube is more than 150 hrs.		5	LJU-2023				
156	2	Three coins are tossed to gather and let random variable X be the number of heads in each outcome. Then find (a) Probability distribution, (b) Mean and (c) standard deviation.		3					
157	2	Define: Mathematical Expectation. Given that $f(x) = \frac{k}{2^x}$ is probability distribution for a random variable that can take on the values x = 0, 1, 2, 3, 4. Find k.		4					
158	2	For the following probability distribution X= 1,2,3,4,5 and f(x)= 0.1, 0.1, 0.2, 0.3, 0.3 (i) Find the mean and variance. (ii) Find the distribution function.		5					
159	2	The probability distribution of a commodity is given below. Demand: 5, 6, 7, 8, 9, 10 Probability: 0.05, 0.10, 0.30, 0.40, 0.10, 0.05 Find expected demand.		4					
160	2	Define probability distribution f(x) = $\frac{x-2}{10}$, x = 0,1,2,3,4		3					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
161	2	The Probability distribution of a random variable x is given below x: -2, -1, 0, 1, 2 $p(x)$: $\frac{1}{12}$, $\frac{1}{3}$, p, $\frac{1}{4}$, $\frac{1}{6}$ Find (i) $E(x)$ (ii) $E(2x+3)$ (iii) $E(5x-2)$.		5					
162	2	Find the expectation for the following discrete probability distribution: x: 10, 14, 18, 25, 35 $p(x)$: 0.125, 0.225, 0.325, 0.200, 0.125		3					
163	2	Find the probability distribution of the number of heads when three coins are tossed.		3					
164	2	A random variable X has a probability mass function given by X: 1, 2, 3, 4 P(X= x): 0.1, 0.2, 0.5, 0.2 Find (i) $P(2 \leq x \leq 4)$, (ii) $P(x \leq 2)$		4					
165	2	A random variable X has the probability distribution $X = 0,1,2,3,4,5,6,7$ $P(X = x) = a, 4a, 3a, 7a, 8a, 10a, 6a, 9a$ Find (i) the value of a, (ii) $P(X < 3)$		4					
166	2	The probability mass function of a random variable x is zero except at the points X=0, 1, 2. At these points it has the values $P(X = 0) = 3c^3$, $P(X = 1) = 4c - 10c^2, P(X = 2) = 5c - 1$ Find (i) c, (ii) $P(X < 1)$, (ii) $P(1 < X \leq 2)$		4					
167	2	If x= {0,1} and y = {0,1} be two independent binary random variables. If $P(X = 0) = p\ and$ $P(Y = 0) = q$. Probability of $(i) P(X + Y \geq 1)$ $(ii)\ P(X = 1)\ (iii)\ P(Y = 1)$		3					
168	2	A random variable X has the following probability function: X: 0, 1, 2, 3, 4, 5, 6, 7 P(X= x): 0, k, 2k, 2k, 3k, k^2, $2k^2$, $7k^2 + k$ (i) Determine k, (ii) Evaluate $P(X < 6)$, (iii) Find the mean and variance		3	LJU-2022				
169	2	A random variable X has the probability distribution X= -2, -1, 0, 1, 2 P(X=x) = 0.2, 0.1, 0.3, 0.3,0.1 Find (i) Mean, (ii) Variance, (iii) E(2X+3), (iv) E(2X-3)		4					
170	2	Show that the function $f(x)$ defined by $f(x) = \begin{cases} \frac{1}{7}, & 1 < x < 8 \\ 0, & otherwise \end{cases}$ is a probability density function for a random variable. Hence find $P(3 < x < 10)$		3					
171	2	The Distribution function of a random variable X is given by $F(x) = \begin{cases} 1 - e^{-x^2} & x > 0 \\ 0 & otherwise \end{cases}$ Find the probability density function.		4					
172	2	Find the value of k such that f(x) is a probability density function. Also find $P(X < 1.5)$. $f(x) = \begin{cases} kx & ; 0 \leq x \leq 1 \\ k & ; 1 \leq x \leq 2 \\ k(3-x) & ; 2 \leq x \leq 3 \end{cases}$		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
173	2	Let X be a continuous random variable with pdf $f(x) = kx(1-x), 0 \le x \le 1$ Find k and determine a number b such that $P(X \le b) = P(X > b)$.		3					
174	2	Check whether the function $f(x) = \begin{cases} \lvert x \rvert & , -1 < x < 1 \\ 0 & , otherwise \end{cases}$ Is a probability density function? If yes, find mean and variance.		3					
175	2	If the random variable X takes the value 1, 2, 3 and 4 such that $2P(X=1) = 3P(X=2) = P(X=3) = 5P(X=4)$. Find the probability distribution.		3					
176	2	The joint distribution of X and Y is given by $f(x,y) = \frac{x+y}{21}$, $x = 1,2,3$ and $y = 1,2$ Find the marginal distribution.		4					
177	2	Give is the joint distribution of X and Y X \ Y: 0 | 1 | 2 0 | 0.02 | 0.08 | 0.10 1 | 0.05 | 0.20 | 0.25 2 | 0.03 | 0.12 | 0.15 Find (i) Marginal distributions (ii) the conditional distributions of X given Y=0		3	LJU-2022				
178	2	From the following table for the bivariate distribution of (x, y). Find $P(X \le 1), P(Y \le 3), P(X \le 1, Y \le 3),$ $P(X \le 1/Y \le 3), P(Y \le 3/X \le 1), P(X+Y \le 4)$ Y \ X: 1 | 2 | 3 | 4 | 5 | 6 0 | 0 | 0 | $\frac{1}{32}$ | $\frac{2}{32}$ | $\frac{2}{32}$ | $\frac{3}{32}$ 1 | $\frac{1}{16}$ | $\frac{1}{16}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ 2 | $\frac{1}{32}$ | $\frac{1}{32}$ | $\frac{1}{64}$ | $\frac{1}{64}$ | 0 | $\frac{1}{32}$		4					
179	2	A random variable X has the following distribution $X = 1,2,3,4,5,6$ $P(X=x) = \frac{1}{36}, \frac{3}{36}, \frac{5}{36}, \frac{7}{36}, \frac{9}{36}, \frac{11}{36}$ Find (i) mean, (ii) variance, (iii) $P(1 < X < 6)$		3					
180	2	A random variable X takes the values $-3,-2,-1,0,1,2,3$ such that $P(X=0) = P(X>0) = P(X<0), P(X=-3) = P(X=-2) = P(X=-1) = P(X=1) = P(X=2) = P(X=3)$. Obtain the probability distribution and distribution function of X.		3					
181	2	The probability density function of a continuous random variable X is given by $f(x) = \begin{cases} ax & 0 \le\le 1 \\ a & 1 \le x \le 2 \\ 3a - ax & 2 \le x \le 3 \\ 0 & otherise \end{cases}$ (i) Find the value of a, and (ii) Find the CDF of X		4					
182	2	The PDF of a continuous random variable X is $f(x) = \frac{1}{2}e^{-\lvert x \rvert}$ Find CDF F(x).		3					
183	2	A man draws two balls from a bag containing 3 white and 5 black balls. If he is to receive 14 Rs for every white ball which he draws and 7 Rs for every		4					

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		black balls, what is his expectations.							
184	2	For the continuous random variable having PDF $f(x) = \begin{cases} 4x^3 & 0 \le x \le 1 \\ 0 & otherwise \end{cases}$ Find mean and variance of X.		4					
185	2	For the continuous random variable having pdf $f(x) = \begin{cases} x & 0 < x \le 1 \\ 2-x, & 1 \le x \le 2 \\ 0, & otherwise \end{cases}$ Find mean and variance of X.		3	LJU-2022				
186	2	The joint probability distribution of two random variables X and Y is given below: Y \ X: 1 | 2 | 3 2 | 1/8 | 1/24 | 1/12 4 | 1/4 | 1/4 | 0 6 | 1/8 | 1/24 | 1/12 Find $P(X < 6),\ P(Y > 1), P(X < 4/Y > 1),$ $P(2 \le X \le 5, Y > 1),\ P(Y = 3/X = 2).$		4					
187	2	Consider Two random Variables X and Y With Joint PMF given in the table. (1) Find $P(X \le 2, Y \le 4)$ (2) Find the Marginal PMFs of X and Y. (3) Find $P(Y = 2 \mid X = 1)$ Y=2 | Y=4 | Y= 5 X=1 | $\frac{1}{12}$ | $\frac{1}{24}$ | $\frac{1}{24}$ X= 2 | $\frac{1}{6}$ | $\frac{1}{12}$ | $\frac{1}{8}$ X= 3 | $\frac{1}{4}$ | $\frac{1}{8}$ | $\frac{1}{12}$		4					
188	2	From the following joint distribution of X and Y. Find the marginal distribution. Y \ X: 0 | 1 | 2 0 | 3/28 | 9/28 | 3/28 1 | 3/14 | 3/14 | 0 2 | 1/28 | 0 | 0		4					
189	2	The joint probability distribution of two random variables X and Y is given below: Y \ X: 0 | 1 | 2 2 | 1/20 | 1/12 | 1/5 4 | 1/15 | $1/k$ | 1/10 6 | 1/12 | 1/6 | 7/60 Find (i) k, (ii) $P(0 < X \le 1)$ and (iii) $P(Y > 2 \ / \ X \le 1)$		4	LJU-2023				
190	3	If mean and mode of some data are 4 and 10 respectively, its median will be:	6	1		1.5	5.4	16	6
191	3	Find the median of the given set of numbers 2, 6, 6, 8, 4, 2, 7, 9.	6	1		6	8	4	5
192	3	Find the median of the data set: 6,3,8,2,9,1.	4.5	1		4.5	5.5	6	5
193	3	A variable X takes values 2,9,3,7,5,4,3,2,10. What is the median?	4	1		2	4	7	8
194	3	The mode of a distribution is 24 and the mean is 60. What is its median?	48	1		50	48	45	51
195	3	The following observations $8, 11, 12, x+6, 17, 18, 23$ are arranged in	9	1		15	9	11	None of these

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		ascending order. The median of the data is 15. Find the value of x.							
196	3	The following table shows the marks of 130 students of class 10. Median of given data is: Marks | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 No. of Candidates | 0 | 4 | 18 | 60 | 33 | 15	57.16	1		61.11	57.16	47.47	54.17
197	3	If the median of the distribution 10, 12, 13, 16, x, 20, 25, 30 is 18, then the value of x is,	20	1		24	22	23	20
198	3	If the median of the data 13, 17, (p+1), (p+5), 24, 27 is 21, then p is equal to	18	1		18	19	20	21
199	3	The median of the following observations 46, 64, 87, 41, 58, 77, 35, 90, 55, 92, 33 is 58. If 92 is replaced by 99 and 41 by 43 in the above data. The new median is,	58	1		56	61	58	49
200	3	The median of the set $\{x+1, x+2, x+3, x+4, x+5, x+6\}$ is,	$x+3.5$	1		$x+3$	$x+4$	$x+3.5$	$x+4.5$
201	3	The median of a set of 9 distinct observations is 20.5. If each of the largest 4 observation of the set is increased by 2, then the median of the new set	remains the same	1		is increased by 2	is decreased by 2	is two times the original median	remains the same
202	3	For the following distribution, N= 100 and median= 32. The values of x and y respectively are, Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | Total Frequency | 10 | x | 25 | 30 | y | 10 | 100	9, 16	1		10, 15	9,16	11,14	8, 17
203	3	Find the mode of the following distribution: Class | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 | 100-120 | 120-140 f | 6 | 8 | 10 | 12 | 6 | 5 | 3	65	1	LJU-2022	60	65	70	75
204	3	The mode of the following frequency distribution is 36. Find the missing frequency f. Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 f | 8 | 10 | f | 16 | 12 | 6 | 7	10	1		12	16	10	9
205	3	What is the mode of the observations 1, 2, 3, 5, 7, 5, 9, 5, 10, 10.	5	1		5	10	1	9
206	3	For a distribution with mean, median, mode and standard deviation 25, 24, 26 and 5 respectively, Karl Pearson's coefficient of skewness equals to:	-0.20	1		-0.20	0.20	1	-1
207	3	For four observations -1, 0, 1, 4, the measure of kurtosis equals	2	1		1	2	3	4
208	3	If the standard deviation of 0, 1, 2, 3,…,9 is k, then the standard deviation of 10, 11, 12, 13,….,19 will be	k	1		k+1	k+2	k	k+10
209	3	The mean and variance of 10 observations are given to be 4 and 2 respectively. If every observation is multiplied by 2, the mean and the variance of the new series will be respectively.	8 & 8	1		8 & 8	8 & 20	8 & 4	80 & 40
210	3	Runs scored by batsman in 5 one day matches are 50, 70, 82, 93, and 20. The standard deviation is _____	25.79	1		25.79	25.49	25.29	25.69
211	3	The standard deviation of 1, 4, 7, 2, 6 is	2.28	1		3.38	0	2.28	1
212	3	The first four moments of a distribution about the	0	1		1	4	2	0

Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		value 4 of the variables are 1,4,10 and 45. What is the third moment about mean (μ_3)							
213	3	For a moderately skewed distribution of retail price for men's shoes, it is found that the mean price is 20 Rs. and the median price is 17 Rs. If the coefficient of variation is 20%, then the Pearson's coefficient of skewness is _____.	2.25	1	LJU-2023	1.5	2.25	1.75	4
214	3	From the marks scored by 100 students in Section A and 100 students in Section B of a class, the following measures were obtained: Section A: $\mu_A = 55$, $\sigma_A = 15.4$, $Mode = 58.72$ Section B: $\mu_B = 53$, $\sigma_A = 15.4$, $Mode = 48.83$ Determine which distribution is marks is more skewed.		3					
215	3	The average grade of male students in the class was 6.2 and that of females was 7.3. The mean grade of all the students was 6.53. Find the percentage of male and female students.		3					
216	3	Find the arithmetic mean for the following data: x: 35, 45, 55, 60, 75, 80 f: 12, 18, 10, 6, 3, 11		3					
217	3	Find the average wages for construction of the building from the wages paid to different workers. Wages: 100, 200, 300, 400, 500 No.of workers: 3, 5, 6, 9, 2		3					
218	3	Find the arithmetic mean of marks from the following data: Marks: 0 – 10, 10 – 20, 20 – 30, 30 – 40, 40 – 50, 50 – 60 No. of student: 12, 18, 27, 20, 15, 8		3					
219	3	The daily earnings (in rupees) of employees working on a daily basis in a firm are Daily earnings (in rupees): 100, 120, 140, 160, 180, 200, 220 Number of employees: 3, 6, 10, 15, 24, 42, 75 Calculate the mean of daily earnings.		3					
220	3	Calculate mean for the following frequency distribution: Class: 0 – 8, 8 – 16, 16 – 24, 24 – 32, 32 – 40, 40 – 48 Frequency: 8, 7, 16, 24, 15, 7		3					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
221	3	The following table gives the distribution of companies according to size of capital. Find the mean size of capital of a company. Capital ($Rs.$ $in\ lacs$: <5 | <10 | <15 | <20 | <25 | <30 No. of companies: 20 | 27 | 29 | 38 | 48 | 53		4					
222	3	The following table gives the distribution of marks by 60 students in a mathematics test Marks: More than 0 | More than 10 | More than 20 | More than 30 | More than 40 | More than 50 No. of students: 60 | 56 | 40 | 20 | 10 | 3 Find Mean.		4					
223	3	Find the median of the data 2, 8, 4, 6, 10, 12, 4, 8, 14, 16.		2					
224	3	Obtain the Median for the following distribution. x: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 f: 8 | 10 | 11 | 16 | 20 | 25 | 15 | 9 | 6		2					
225	3	Wages earned in Rupees per day by the labourers are given the table: Wages in Rs.: 10-20 | 20-30 | 30-40 | 40-50 | 50-60 No. of Lab.: 5 | 8 | 13 | 10 | 8 Find the median of the distribution.		4					
226	3	The following data represents the number of foreign visitors in a multinational company in every 10 days during last 2 months. Use the data to find median. X: 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 No. of Visitors: 12 | 18 | 27 | 20 | 17 | 06		3					
227	3	Find the missing frequency when median is 24. Marks: 0-10 | 10-20 | 20-30 | 30-40 | 40-50 No. of Students: 15 | 20 | x | 14 | 16		3					
228	3	The following table gives the marks obtained by 50 students in mathematics. Find the median. Marks: 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 No. of student: 4 | 6 | 10 | 5 | 7 | 3 | 9 | 6		3					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
229	3	The following tables gives the distribution of daily wages of 900 workers. However, the frequencies of classes $40-50$ *and* $60-70$ are missing. If the median of the distribution is 59.25 Rs, find the missing frequencies. Wages (in Rs.) | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 No. of Workers | 120 | ? | 200 | ? | 185		4					
230	3	Find the value of X & Y of following data who's median is 46 and total frequency is 229. Class | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 Frequency | 12 | 30 | X | 65 | Y | 25 | 18		4					
231	3	Find the mean and median of the following data: Classes | 0-30 | 30-60 | 60-90 | 90-120 | 120-150 | 150-180 f | 8 | 13 | 22 | 27 | 18 | 7		4					
232	3	Find the mode of the following frequency distribution. x | 1 | 2 | 3 | 4 f | 4 | 7 | 10 | 8		2					
233	3	Find the mode for the following distribution: Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 F | 4 | 7 | 8 | 12 | 25 | 18 | 10		3					
234	3	An incomplete frequency distribution is given as follow: Class | 0-400 | 400-800 | 800-1200 | 1200-1600 | 1600-2000 | 2000-2400 | 2400-2800 | 2800-3200 f | 14 | 22 | x | 124 | y | 32 | 15 | 5 Given that the mode value is 1376, and frequency total is 360. Calculate the missing frequencies.		4					
235	3	The frequency distribution of marks obtained by 60 students of a class in a college is given by Marks: | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 frequency: | 3 | 5 | 12 | 18 | 14 | 6 | 2 Find the mode of the distribution.		3					
236	3	Following data related to the number of telegraphic transfers per day by a bank branch for 300 working days No of telegraphic transfer | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		per day | | | | | | | | | Number of days | 10 | 35 | 45 | 95 | 64 | 32 | 10 | 9 | calculate mean, mode and median.							
237	3	The table below shows the scores (out of 60) of applicants in an aptitude test. Calculate the mean, median and mode of the distribution. Scores | 1-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 Frequency | 5 | 6 | 8 | 10 | 7 | 4		3					
238	3	An insurance company obtained the following data for accident claims (in thousand rupees) from a particular region. Find its mean, median and Mode. Amount | 1-3 | 3-5 | 5-7 | 7-9 | 9-11 | 11-13 Frequency | 6 | 47 | 75 | 46 | 18 | 8		4					
239	3	Find the mean, median and Mode for the following frequency distribution: x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 f | 4 | 7 | 8 | 10 | 6 | 6 | 4 | 2 | 2 | 1		4					
240	3	Calculate median. Marks (less than) | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 No. of students | 29 | 224 | 465 | 582 | 634 | 644 | 650 | 653 | 655		3					
241	3	Find the mean, median and Mode for the following frequency distribution: Class | 50-53 | 53-56 | 56-59 | 59-62 | 62-65 | 65-68 | 68-71 | 71-74 | 74-77 Frequency | 3 | 8 | 14 | 30 | 36 | 28 | 16 | 10 | 3		5					
242	3	Find the standard deviation for the following data: x | 5 | 10 | 15 | 20 | 25 f | 7 | 4 | 6 | 3 | 5		3					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
243	3	Find standard deviation from the following data. Class | 9-11 | 12-14 | 15-17 | 18-20 Frequency | 2 | 3 | 4 | 1		3					
244	3	From the following data calculate moments about (i) Assumed mean 25 (ii) Actual mean (iii) Zero. Variable | 0-10 | 10-20 | 20-30 | 30-40 Frequency | 1 | 3 | 4 | 2		5					
245	3	Find the third moment about mean for the following frequency distribution: x | 5 | 7 | 10 | 18 | 26 f | 5 | 14 | 22 | 6 | 3		4					
246	3	Calculate the first four moments of the following distribution about the mean. x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 f | 1 | 8 | 28 | 56 | 70 | 56 | 28 | 8 | 1		4					
247	3	Calculate the first four moments about mean of the following data: x | 5 | 10 | 15 | 20 | 25 f | 6 | 10 | 14 | 6 | 4		4					
248	3	Obtain fist four moments about arbitrary origin from the following table: Scores | 50 − 60 | 60 − 70 | 70 − 80 | 80 − 90 | 90 − 100 Players | 8 | 11 | 18 | 09 | 04		4					
249	3	Calculate the first four moments from the following data: x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 f | 5 | 10 | 15 | 20 | 25 | 20 | 15 | 10 | 5 Also calculate the values of $\beta_1$and β_2.		5					
250	3	The quantities of water (in litres) supplied by municipal corporation on ten consecutive days in certain area are shown below: 218.2, 199.7, 207.3, 185.4, 213.7, 184.7, 179.5, 194.4, 224.3, 203.5. Evaluate the mean & the first four central moments of the water (in litres) of that area.		4					
251	3	Calculate Karl Pearson's coefficient of skewness from the following data. X | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 | 100-110 | 110-120 | 120-130 | 130-140 f | 5 | 6 | 8 | 10 | 25 | 30 | 36 | 50 | 60 | 70		4	LJU-2022 LJU-2023				

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
252	3	Find Karl Pearson's coefficient of skewness for the following data Marks: 20, 21, 22, 23, 24, 25, 26, 27, 28 No. of students: 7, 12, 25, 10, 8, 6, 8, 3, 1		3					
253	3	Find Karl Pearson's coefficient of skewness for the following data: x: 0-10, 10-20, 20-30, 30-40, 40-50 f: 13, 20, 30, 25, 12		4					
254	3	The following data relate to the profits of 1,000 companies: Profits Rs. in thousands: 100 - 120, 120 - 140, 140 - 160, 160 - 180, 180 - 200, 200 - 220, 220 - 240 No. of companies: 17, 53, 199, 194, 327, 208, 02 Calculate the coefficient of skewness.		4					
255	3	The first three moments of distribution about the value two of the variables are 1, 16 and -40. Show that the mean = 3, variance = 15 and $\mu_3 = -86$.		3					
256	3	The first four raw moments of distribution are $2, 136, 320$ and 40000. Calculate the first four moments about mean. Also find skewness.		3	LJU-2022				
257	3	First three moments of a distribution about 3 are $2, 70, 150$ respectively. Find those moments about 4.		3	LJU-2023				
258	3	In a distribution, the $mean = 65, median = 70, coefficient\ of\ skewness = -0.6$. find mode and coefficient of variation.		3					
259	3	For a group of 10 items, $\sum x = 452, \sum x^2 = 24270$, and mode = 43.7. Find the Karl Pearson's coefficient of skewness.		3					
260	4	The coefficient of correlation between two variables x and y is 0.48. The covariance is 36. The variance of x is 16. The standard deviation of y is:	18.75	1	LJU-2022	10.15	13.32	16.5	18.75
261	4	Calculate the correlation coefficient between the following values: X: 3, 5, 1, 7, 5. Y: 4, 3, 0, 8, 2	0.8	1		0.9	0.8	1	0.6
262	4	The values of correlation coefficient lie in the interval:	[-1, 1]	1		[0, 1]	[-1, 1]	[1, 2]	[-1, 0]
263	4	If six hand writings were ranked by two judges in a competition and the rankings are as follows: Judge 1: 6, 5, 4, 3, 2, 1 Judge 2: 1, 2, 3, 4, 5, 6	-1	1	LJU-2022	-0.5	1	-1	0.5

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
264	4	Calculate the rank correlation coefficient, if two judges in a beauty contest ranked the entries as follows Judge X: 1 2 3 4 5 Judge Y: 5 4 3 2 1	-1	1		-0.5	1	-1	0.5
265	4	If the sum of the squares of difference of ranks of 6 candidates in two criteria is 21, the rank correlation coefficient is_____	0.4	1		0.1	0.2	0.3	0.4
266	4	The two lines of regression are $8x - 10y = 66$ and $40x - 18y = 214$, and variance of x series is 9. What is the standard deviation of y series?	4	1	LJU-2023	3	4	6	8
267	4	The two regression lines are given by $x - y + 1 = 0$ and $2x - y + 4 = 0$. The two regression lines pass through the point:	$(-3,-2)$	1		$(-4,-3)$	$(-6,-5)$	$(3,-2)$	$(-3,-2)$
268	4	If two regression coefficients are -0.1 and -0.9, then correlation coefficient is,	-0.3	1		0.3	-0.3	-0.9	0.9
269	4	If two regression coefficients are -0.8 and -0.2, what would be the value of coefficient of correlation?	-0.4	1		0.4	-0.4	0.16	-0.16
270	4	The two regression lines of a sample are $x + 6y = 6$ and $3x + 2y = 10$. Then coefficient of correlation between x and y is	$-1/3$	1		$-1/3$	$2/3$	$-2/3$	$3/4$
271	4	The two regression lines x and y always intersect at points	$(\bar{x}, \bar{y})$	1		$(\bar{x}, \bar{y})$	(x, y)	(0,0)	(-1,1)
272	4	If $r = 0$ then the regression coefficients are	0	1		0	1	-1	90
273	4	The regression lines of a sample are $x + 6y = 6$ and $3x + 2y = 10$. Find the sample means $\bar{x}$ and $\bar{y}$.	(3,0.5)	1		$(-3,-0.5)$	(3,0.5)	$(-3,0.5)$	$(3,-0.5)$
274	4	If the two lines of regression are $4x - 5y + 30 = 0$ and $20x - 9y - 107 = 0$ which of these are lines of regression of x on y?	$20x - 9y - 107 = 0$	1		$20x - 9y - 107 = 0$	$4x - 5y + 30 = 0$	$-20x + 9y + 107 = 0$	$4x + 5y - 30 = 0$
275	4	From the following data calculate the regression coefficient b_{yx}? X: 6 2 10 4 8 Y: 9 11 5 8 7	-0.65	1		0.65	-0.65	1.3	-1.3
276	4	If the difference between the rank of the 4 observations is $2.5, 0.5, -1.5, -1.5$ then Spearman's rank correlation coefficient equals to _____.	None of these	1	LJU-2023	0.23	0.1	-0.1	None of these
277	4	Obtain the two regression lines from the following data and hence find the correlation coefficient. x: 6 2 10 4 8 y: 9 11 5 8 7		4					
278	4	Find the line of regression of y on x. x: 1.53 1.78 2.60 2.95 3.42 y: 33.5 36.3 40.0 45.8 53.5		3					
279	4	Calculate the coefficient of correlation and obtain the lines of regression for the following: X: 1 2 3 4 5 6 7 8 9 Y: 9 8 10 12 11 13 14 16 15		4					
280	4	Find correlation coefficient for the data given below. x: 4 5 9 14 18 22 24 y: 16 22 11 16 7 3 17		3					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
281	4	Calculate the co-efficient of correlation between the given series of data for x and y in the following table: x: 54, 57, 55, 57, 56, 52, 59 y: 36, 35, 32, 34, 36, 38, 35		3					
282	4	Let 3x + 2y = 26 and 6x + y = 31, be the two regression lines. (i) Find the mean value and correlation coefficient between x and y (ii) if the variance of y is 4 find the standard deviation of x.		4					
283	4	Find the coefficient of correlation from the data: x = 7, 8, 9, 11, 10, 13, 12 y = 1, 2, 3, 4, 5, 6, 7		3					
284	4	Given $n = 10, \sigma_X = 5.4, \sigma_Y = 6.2$ and the sum of the product of the deviations from the mean of x and y is 66. Find correlation coefficient.		3					
285	4	The coefficient of rank correlation of the marks obtained by 10 students in physics and chemistry was found to be 0.5. It was later discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 3 instead of 7. Find the correct coefficient of the rank correlation.		4					
286	4	Obtain the correlation coefficient for the following data: x: 100, 98, 78, 85, 110, 93, 80 y: 85, 90, 70, 72, 95, 81, 74		4					
287	4	Calculate the correlation coefficient between x and y from the following data: $n = 10, \sum x = 140, \sum y = 150,$ $\sum(x-10)^2 = 180,\ \sum(y-15)^2 = 215,$ $\sum(x-10)(y-15) = 60.$		4	LJU-2023				
288	4	The following table shows how 10 students were ranked according to their achievements in both the laboratory and lecture portions of a python course. Find the coefficient of rank correlation Laboratory: 8, 3, 9, 2, 7, 10, 4, 6, 1, 5 Lecture: 9, 5, 10, 1, 8, 7, 3, 4, 2, 6		3					
289	4	Determine the correlation coefficient between temperature (in ^oC) and ice cream sales (in $). Temperature: 14.2, 16.4, 11.9, 15.2, 18.5, 22.1, 19.4, 25.1, 23.4, 18.1, 22.6, 17.2 Icecream sales: 215, 325, 185, 332, 406, 522, 412, 614, 544, 421, 445, 408		3					
290	4	Calculate the coefficient of correlation for the following pairs of x and y: x: 17, 19, 21, 26, 20, 28, 26, 27 y: 23, 27, 25, 26, 27, 25, 30, 33		4					
291	4	Find the regression coefficient of y on x for the following data: x: 1, 2, 3, 4, 5 y: 160, 180, 140, 180, 200		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
292	4	The ranks of same 16 students in Maths and MOS are as follows: Maths: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 MOS: 1, 10, 3, 4, 5, 7, 2, 6, 8, 11, 15, 9, 14, 12, 16, 13 Calculate the rank correlation coefficient for proficiencies of this group in given subjects.		4					
293	4	The following table gives the marks obtained by 11 students in Mathematics and Physics translation, Find the rank correlation coefficient. Mathematics: 40, 46, 54, 60, 70, 80, 82, 85, 85, 90, 95 Physics: 45, 45, 50, 43, 40, 75, 55, 72, 65, 42, 70		3					
294	4	The number of bacterial cells(y) per unit volume in a culture at different hours(x) is given below: x: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 y: 43, 46, 82, 98, 123, 167, 199, 213, 245, 272 Fit a line of regression of y on x and x on y. estimate the number of bacterial cells after 15 hours.		4	LJU-2023				
295	4	Find the coefficient of correlation by spearman's method from the following data: IQ X_i: 106, 86, 100, 101, 99, 103, 97, 113, 112, 110 Hours Y_i: 7, 0, 27, 50, 28, 29, 20, 12, 6, 17 The above data shows the correlation between the IQ of a person and number of hours spent in front of the TV per week by person.		4					
296	4	Following are the scores of ten students in class and their IQ: Score: 35, 40, 25, 55, 85, 90, 65, 55, 45, 50 IQ: 100, 100, 110, 140, 150, 130, 100, 120, 140, 110 Calculate the rank correlation co-efficient between the score and IQ.		4					
297	4	Find the correlation coefficient from the following data: X: 50, 50, 55, 60, 65, 65, 65, 60, 60, 50 Y: 11, 13, 14, 16, 16, 15, 15, 14, 13, 13		4	LJU-2022				
298	4	Raw material used in the production of a synthetic fibre is stored in a place which has no humidity control. Measurements of the relative humidity in the storage place and the moisture content of a sample of the raw material (both in %) on 7 days yielded the following results: Humidity (x): 42, 35, 50, 43, 48, 62, 31 Moisture content (y): 12, 8, 14, 9, 11, 16, 7 Find the lines of regression of y on x and x on y.		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
299	4	Compute the coefficient of correlation between X and Y using the following data: X: 2, 4, 5, 6, 8, 11 Y: 18, 12, 10, 8, 7, 5		3					
300	4	Find the Correlation coefficient and lines of regression from the following data: x: 57, 58, 59, 59, 60, 61, 62, 64 y: 67, 68, 65, 68, 72, 72, 69, 71 Find the value of y when x = 66		4					
301	4	Obtain both the lines of regression for the following data and hence find the correlation coefficient. x: 60, 34, 40, 50, 45, 41, 22, 43 y: 75, 32, 34, 40, 45, 33, 12, 30		4					
302	4	Obtain the two lines of regression for the following data: Sales: 190, 240, 250, 300, 310, 335, 300 Advertising expenditure: 5, 10, 15, 20, 20, 30, 30		4					
303	4	The following data gives the age and blood pressure (BP) of 10 sports persons. Name: A, B, C, D, E, F, G, H, I, J Age (X): 42, 36, 55, 58, 35, 65, 60, 50, 48, 51 BP (Y): 98, 93, 110, 85, 105, 108, 82, 102, 118, 99 (1) Find the regression equation of Y on X and X on Y. (2) Find the correlation coefficient.		4	LJU-2022				
304	4	Find the regression equation showing the capacity utilization on production from the following data: Average: Production (in lakh units) 35.6; Capacity utilization (in %) 84.8 Standard Deviation: Production (in lakh units) 10.5; Capacity utilization (in %) 8.5 Correlation Coefficient: $r = 0.62$ Estimate the production when capacity utilization is 70%.		4					
305	4	Given that $n = 25, \sum X = 125, \sum X^2 = 650, \sum Y = 100, \sum Y^2 = 460$ and $\sum XY = 508$. It was later discovered at the time of checking that he had copied down two pairs as (6,14) and (8,6) while the correct pairs were (8,12) and (6,8). Obtain the correct value of the correlation coefficient.		4					

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<table>
<tr><th>Sr. No.</th><th>unit_ number</th><th>Question text</th><th>Answer</th><th>Marks</th><th>Previous Year</th><th>Option 1</th><th>Option 2</th><th>Option 3</th><th>Option 4</th></tr>
<tr><td>306</td><td>4</td><td>From the following data of the marks obtained by 8 students in Computer Networking (CN) and Compiler Design (CD) papers, compute rank coefficient of correlation.
<table>
<tr><td>CN</td><td>15</td><td>20</td><td>28</td><td>12</td><td>40</td><td>60</td><td>20</td><td>80</td></tr>
<tr><td>CD</td><td>40</td><td>30</td><td>50</td><td>30</td><td>20</td><td>10</td><td>30</td><td>60</td></tr>
</table></td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>307</td><td>4</td><td>The coefficient of rank correlation of marks obtained by 10 students in English and Economics was found to be 0.6. It was later discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 7 instead of 1. Find the correct coefficient of rank correlation.</td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>308</td><td>4</td><td>Compute the coefficient of rank correlation between Economics marks and Statistics marks as given below:
<table>
<tr><td>Economics marks</td><td>80</td><td>56</td><td>50</td><td>48</td><td>50</td><td>62</td><td>60</td></tr>
<tr><td>Statistics marks</td><td>90</td><td>75</td><td>75</td><td>65</td><td>65</td><td>50</td><td>65</td></tr>
</table></td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>309</td><td>4</td><td>In partially destroyed laboratory record of an analysis of correlation data, the following results are eligible.
• Variance of x, $\sigma_x^2 = 9$
• Two line of regressions: $8x - 10y + 66 = 0$, $40x - 18y = 214$.
From the above obtain mean values of x and y, the standard deviation of y and correlation coefficient.</td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>310</td><td>4</td><td>Psychological tests of intelligence and of engineering ability were applied to 10 students as per the following data. Find the coefficient of correlation.
<table>
<tr><td>Intelligence</td><td>105</td><td>104</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>96</td><td>93</td><td>92</td></tr>
<tr><td>ability</td><td>101</td><td>103</td><td>100</td><td>98</td><td>95</td><td>96</td><td>104</td><td>92</td><td>97</td><td>94</td></tr>
</table></td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>311</td><td>4</td><td>In a college, IT department has arranged one competition for IT students to develop an efficient program to solve a problem. Ten students took part in the competition and ranked by two judges given in the following table. Find the degree of agreement between the two judges using Rank correlation coefficient. (J=Judge)
<table>
<tr><td>J-1</td><td>3</td><td>5</td><td>8</td><td>4</td><td>7</td><td>10</td><td>2</td><td>1</td><td>6</td><td>9</td></tr>
<tr><td>J-2</td><td>6</td><td>4</td><td>9</td><td>8</td><td>1</td><td>2</td><td>3</td><td>10</td><td>5</td><td>7</td></tr>
</table></td><td></td><td>3</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>312</td><td>4</td><td>Calculate the Co-efficient of correlation from the following data:
<table>
<tr><td>x</td><td>12</td><td>9</td><td>8</td><td>10</td><td>11</td><td>13</td><td>7</td></tr>
<tr><td>y</td><td>14</td><td>8</td><td>6</td><td>9</td><td>11</td><td>12</td><td>3</td></tr>
</table></td><td></td><td>3</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

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Introduction to Probability Theory and Stochastic Processes Practice Book
(Sem- III)

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
313	4	Calculate the correlation coefficient between the following values of demand and the corresponding price of a commodity: Demand: 65, 66, 67, 67, 68, 69, 70, 72 Price: 67, 68, 65, 68, 72, 72, 69, 71		4					
314	4	Ten competitors in a musical test were ranked by the three judges A, B and C in the following order: Rank by A: 1, 6, 5, 10, 3, 2, 4, 9, 7, 8 Rank by B: 3, 5, 8, 4, 7, 10, 2, 1, 6, 9 Rank by C: 6, 4, 9, 8, 1, 2, 3, 10, 5, 7 Using the rank correlation method, find which pair of judges has the nearest approach to common liking in music.		3					
315	4	Obtain the rank correlation coefficient from the following data: x: 10, 12, 18, 18, 15, 40 y: 12, 18, 25, 25, 50, 25		3					
316	4	If the two lines of regression are $4x - 5y + 30 = 0$ and $20x - 9y - 107 = 0$, which of these are lines of regression of x on y and y on x? Find r and σ_y when $\sigma_x = 3$.		4					
317	5	If 'p', 'q' and 'n' are probability of success, failure and number of trials respectively in a Binomial Distribution, what is its Standard Deviation?	$\sqrt{npq}$	1		$\sqrt{np}$	$\sqrt{pq}$	$(np)^2$	$\sqrt{npq}$
318	5	If 'm' is the mean of a Poisson Distribution, then variance is given by _____.	m	1		m^2	$\sqrt{m}$	m	$\frac{m}{2}$
319	5	If 'λ' is the mean of Poisson Distribution, the $P(0)$ is given by _____.	$e^{-\lambda}$	1		$e^{-\lambda}$	e^{λ}	e	λ^{-e}
320	5	For a Poisson Distribution, if mean $= 1$, then $P(1)$ is?	$\frac{1}{e}$	1		$\frac{1}{e}$	e	$\frac{e}{2}$	Indeterminate form
321	5	Consider a random variable to which a Poisson distribution is best fitted. It happens that $P(X = 1) = \frac{2}{3} P(X = 2)$ on this distribution plot. The variance of this distribution will be _____	3	1	LJU-2023	3	1	2	$\frac{2}{3}$
322	5	If X is a poisson random variate with mean 3, then $P(\lvert X - 3 \rvert < 1)$ will be _____.	$\frac{9}{2}e^{-3}$	1	LJU-2022	$\frac{9}{2}e^{-3}$	$3e^{-3}$	$\frac{e^{-3}}{2}$	$\left(\frac{99}{8}\right)e^{-3}$
323	5	A lot has 10 % defective items. Ten items are chosen randomly from this lot. The probability that exactly 2 of the chosen items are defective is	0.1937	1		0.0036	0.1937	0.2234	0.3874
324	5	In a binomial distribution the mean is 15 and variance is 10, then parameter n is	45	1		28	16	45	25

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
325	5	Consider an unbiased cubic dice with opposite faces colored identically and each face-colored red, blue or green such that each color appears only two times on the dice. If the dice thrown thrice, the probability of getting red color on top face of the dice at least twice is _____.	$\frac{7}{27}$	1		$\frac{7}{27}$	$\frac{10}{127}$	$\frac{19}{27}$	$\frac{1}{3}$
326	5	The number of tosses of a coin that are needed so that the probability of getting at least one head being 0.875 is _____.	3	1		2	3	4	5
327	5	If 20% of the bolts produced by a machine are defective, the probability that out of 4 bolts chosen, at most 2 bolts will be defective is,	0.9728	1		0.9728	0.2897	0.4096	0.1536
328	5	A fair coin is tossed independently four times. The probability of the event “the number of times heads show up is more than the number of times tails show up”	$\frac{5}{16}$	1		$\frac{5}{16}$	$\frac{1}{4}$	$\frac{1}{16}$	$\frac{7}{16}$
329	5	A fair coin is tossed 6 times. The probability of obtaining at least 5 heads is,	0.1094	1		0.1094	0.4019	0	0.9410
330	5	A dice is thrown 6 times. If getting an odd number is a success, the probability of 5 successes is,	3/32	1		3/32	1/32	63/64	7/64
331	5	A dice is thrown 6 times. If getting an odd number is a success, the probability of at least 5 successes is,	7/64	1		3/32	1/32	7/64	63/64
332	5	A dice is thrown 6 times. If getting an odd number is a success, the probability of at the most 5 successes is,	63/64	1		3/32	1/32	7/64	63/64
333	5	If the probability of a defective bolt is 0.1. What will be the mean of the distribution of defective bolts in a total of 400?	40	1		50	60	40	70
334	5	Find the expectation for how many bacteria there are per field if there are 2350 bacteria are randomly distributed over 340 fields (all having the same size) next to each other.	6.91	1		4.98	3.875	6.91	7.37
335	5	A student arrives late for a class 40% of the time. Class meets five times each week. The probability if student being late for at least three classes in a given week is,	0.317	1		0.317	0	0.5	0.517
336	5	A student arrives late for a class 40% of the time. Class meets five times each week. The probability of student will not be late at all during a given week is,	0.0778	1		0	0.0778	0.0887	0.0227
337	5	The mean and variance of a binomial variate are 8 and 6 then parameter n is	32	1		22	28	32	35
338	5	In a company, there are 250 workers. The probability of a worker remain absent on any day is 0.02. The probability that on a day seven workers are absent is,	0.104	1		0.104	0	0.905	0.401
339	5	In the inspection of tin plate produced by a continuous electrolytic process, 0.2 imperfections spotted per minute, on average. The probability of spotting one imperfection in 3 minutes is,	0.329	1		0.329	0	0.923	0.239
340	5	In the inspection of tin plate produced by a continuous electrolytic process, 0.2 imperfections spotted per minute, on average. The probability of spotting at least two imperfections in 5 minutes is,	0.2644	1		0.4426	0	0.2644	0.3678
341	5	In the inspection of tin plate produced by a continuous electrolytic process, 0.2 imperfections spotted per minute, on average. The probability of spotting at most one imperfection in 15 minutes is,	0.199	1		0.199	0	0.2644	0.3678
342	5	The number of defects in a thin copper wire follows Poisson distribution with mean 2.3 defects per millimeter. Then the probability of exactly two defects per millimeter of wire is,	0.2652	1		0	0.23	0.2652	0.5226
343	5	If $P(1) = P(5)$ in Poisson distribution, then the value of mean is,	3.31	1		3.31	3.38	5.38	6.38
344	5	In an experiment, positive and negative values are equally likely to occur. The probability of obtaining at most one negative value in five trials is _____.	$\frac{6}{32}$	1	LJU-2022	$\frac{1}{32}$	$\frac{6}{32}$	$\frac{5}{32}$	$\frac{7}{32}$
345	5	If ‘16’ is the mean of a Poisson Distribution, then variance is given by _____	16	1		2	4	12	16

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
346	5	A student takes an 18-question multiple choice exam, with four choice per question. Suppose one of the choices in obviously incorrect, and the student makes an “educated” guess of the remaining choices, then the expected number of the correct answer is	6	1		9	10	8	6
347	5	The overall percentage of failure in an examination is 30. What is the probability that in a group of 5 students at least 4 passed the examination?	0.5282	1	LJU-2023	0.3216	0.4658	0.5282	0.5916
348	5	Obtain the binomial distribution for which mean is 10 and variance is 5.		2					
349	5	The mean and variance of a binomial variate are 8 and 6. Find $P(X \geq 2)$.		2					
350	5	A student is to match three historical events (Gandhi’s birth, India’s freedom and first world war) with three years 1947,1914 and 1869.If he guesses, with no knowledge of the correct answers, obtain the probability distribution of the number of answers he gets correctly.		3					
351	5	The probability that a patient will be cured of corona virus when injected with the new vaccine is 0.8. Find the probability that exactly 3 out of the 8 corona virus patients will be cured on being injected with the vaccine.		3					
352	5	The average percentage of failure in a certain examination is 40. What is the probability that out of a group of 6 candidates, at least 4 passed in examination?		3					
353	5	If 3 of 12 car drivers do not carry driving license, what is the probability that a traffic inspector who randomly checks 3 car drivers, will catch 1 for not carrying driving license. (use binomial dist.)		3					
354	5	4 coins are tossed simultaneously. What is the probability of getting (i) 2 heads? (ii) at least 2 heads? (iii) at most 2 heads?		3					
355	5	A multiple-choice test consists of 8 questions with 3 answers to each question (of which only one is correct). A student answers each question by rolling a balanced die and checking the first answer if he gets 1 or 2, the second answer if he gets 3 or 4, and the third answer if he gets 5 or 6. To get a distinction, the student must secure at least 75% correct answers. If there is no negative marks, what is the probability that the student secures a distinction?		3					
356	5	The probability of a man hitting a target is $\frac{1}{3}$. (i) If he fires 5 times, what is the probability of his hitting the target at least twice? (ii) How many times must he fire so that the probability of his hitting the target at least once is more than 90%?		3					
357	5	If hens of certain breed lays eggs on 5 days a week on an average, find how many days during a season of 100 days a will poultry keeper with 5 hens of this breed expect to receive at least 4 eggs.		3					
358	5	An irregular 6 faced die is thrown such that the probability that it gives 3 even numbers in 5 throws is twice the probability that it gives 2 even numbers in 5 throws. How many sets of exactly 5 trials can be expected to give no even number out of 2500 sets?		3					

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Sr. No.	**unit_ number**	**Question text**	**Answer**	**Marks**	**Previous Year**	**Option 1**	**Option 2**	**Option 3**	**Option 4**
359	5	Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys? (ii) 5 girls? (iii) either 2 or 3 boys? (iv) at least one boy? Assume equal probabilities for boys and girls.		4					
360	5	Out of 1000 families with 4 children each, how many would you expect to have (i) 2 boys and 2 girls? (ii) at least one boy? (iii) no girl? (iv) at most two girls?		4					
361	5	Fit a binomial distribution to the following data: x: 0 1 2 3 4 5 f: 2 14 20 34 22 8		4					
362	5	Seven unbiased coins are tossed 128 times and the number of heads obtained is noted as given below: No. of heads: 0 1 2 3 4 5 6 7 Frequency: 7 6 19 35 30 23 7 1 Fit a binomial distribution to the data.		3	LJU-2023 MGV				
363	5	It is known from past records that 80% of the students in a school do their homework. Find the probability that during a random check of 10 students (i) all have done their homework (ii) at the most two have not done their homework and (iii) at least one has not done the homework.		4					
364	5	Fit a binomial distribution to the following data: x: 0 1 2 3 4 f: 12 66 109 59 10		4					
365	5	In a binomial distribution, the sum and product of the mean and variance are $\frac{25}{3}$ and $\frac{50}{3}$ respectively. Determine the distribution.		3					
366	5	The mean and variance of a binomial distribution are 3 and 1.2 respectively. Find n, p and $P(X < 4)$.		2					
367	5	If a publisher of nontechnical books takes great pains to ensure that its books are free of typographical errors, so that the probability of any given page containing at least one such error is 0.005 and errors are independent from page to page, what is the probability that one of its 400-page novels will contain (i) exactly one page with errors? (ii) At most three pages with errors?		3					
368	5	Assume that on the average one telephone number out of fifteen called between 1 p.m. and 2 p.m. on week days is busy. What is the probability that if 6 randomly selected telephone numbers are called (i) not more than three, (ii) at least three of them would be busy?		3					
369	5	In eight throws of a die, 5 or 6 is considered as a success. Find the mean number of success and the standard deviation.		2					
370	5	If 10% of the screws produced by a machine are defective, find the probability that out of 5 screws chosen at random, (i) none is defective, (ii) one is defective, and (iii) at most two are defective.		3					
371	5	In sampling a large number of parts manufactured by a machine, the mean number of defectives in a sample of 20 is 2. Out of 1000 such samples, how many would be expected to contain exactly two defective parts?		3					
372	5	A multiple-choice test in mathematics with 40		3					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		questions, each having 5 options, is given to a student. If the student guesses all questions, what are the mean and standard deviation of the number of correct answers? (Use Binomial Distribution)							
373	5	Suppose that a central university has to form a committee of 5 members from a list of 20 candidates out of whom 12 are teachers and 8 are students. If the members of the committee are selected at random. What is the probability that the majority of the committee members are students?		3					
374	5	In a binomial distribution consisting of 5 inependent trials, the probability of 1 and 2 successes are 0.4096 and 0.2048 respectively. Find the parameter p of the distribution.		3					
375	5	Assume that half the population is vegetarian so that the chance of an individual being vegetarian is $\frac{1}{2}$. Assuming that 100 investigators each take sample of 10 individuals to see whether they are vegetarians. How many investigators would you expect to report that three people or less were vegetarian?		3	LJU-2022				
376	5	If 10% of toys produced by a machine are defective. Determine the probability that out of 10 toys, chosen at random (I) 1 (II) none (III) at most 2 toys will be defective.		4					
377	5	A book contains 100 misprints distributed randomly throughout its 100 pages. What is the probability that a page observed at random contains at least two misprints? Assume Poisson Distribution.		3					
378	5	A car hire firm has two cars which it hires out day to day. The number of demands for a car on each day is distributed as Poisson variate with mean 1.5. Calculate the proportion of days on which (i) neither car is used, and (ii) some demand is refused. ($e^{-1.5} = 0.2231$).		3					
379	5	The number of flaws in a fiber optic cable follows a Poisson process with an average of 0.6 per 100 feet. (i) Find the probability of exactly 2 flaws in a 200-foot cable. (ii) Find the probability of exactly 1 flaw in the first 100 feet and exactly 1 flaw in the second 100 feet.		3	LJU-2023				
380	5	Potholes on a highway can be a serious problem. The past experience suggests that there are, on the average, 2 potholes per mile after a certain amount of usage. It is assumed that the Poisson process applies to the random variable "number of potholes." What is the probability that no more than 4 potholes will occur in a given section of 5 miles?		3					
381	5	If the mean of a Poisson variable is 1.8, find (i) $P(X > 1)$ (ii) $P(X = 5)$ (iii) $P(0 < X < 5)$.		3					
382	5	If X is a Poisson variate such that $3P(X = 4) = \frac{1}{2}P(X = 2) + P(X = 0)$. Find (i) the mean of X (ii) $P(X \leq 2)$.		3					
383	5	An insurance company insured 4000 people against loss of both eyes in a car accident. Based on previous data, the rates were computed on the assumption that on the average, 10 persons in 100000 will have car accidents each year that result in this type of injury. What is the probability that more than 3 of the insured will collect on their policy in a given year?		3					
384	5	Assume that the probability of an individual coal miner being killed in a mine accident during a year is 1/2400. Use the Poisson distribution to calculate the probability that in a mine employing 200 miners, there will be at least one fatal accident in a year.		4					
385	5	Suppose a book of 585 pages contains 43		3					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		typographical errors. If these errors are randomly distributed throughout the book, what is the probability that 10 pages, selected at random, will be free from errors?							
386	5	The number of accidents in a year attributed to taxi drivers in a city follows Poisson distribution with a mean of 3. Out of 1000 taxi drivers, find approximately the number of drivers with (i) no accidents in a year (ii) more than 3 accidents in a year.		3	LJU-2022				
387	5	Assuming that the typing mistakes per page committed by a typist follows a Poisson distribution, find the expected frequencies for the following distribution of typing mistakes: Number of mistakes per page: 0, 1, 2, 3, 4, 5 Number of pages: 40, 30, 20, 15, 10, 5		4					
388	5	A manufacturer of electric bulbs sends out 500 lots each consisting of 100 bulbs. If 5 % bulbs are defective, in how many lots can we expect (i) 97 or more good bulbs? (ii) less than 96 good bulbs?		3					
389	5	In a certain factory producing certain articles, the probability that an article is defective is $\frac{1}{500}$ .The articles are supplied in packets of 20. Find approximately the number of packets containing no defective, one defective, two defectives in a consignment of 20000 packets.		4					
390	5	Fit a Poisson distribution to the following data: x: 0, 1, 2, 3, 4, 5, 6, 7, 8 f: 56, 156, 132, 92, 37, 22, 4, 0, 1		4					
391	5	If X is a Poisson variate such that $P(X = 0) = P(X = 1)$, find $P(X = 0)$ and using recurrence relation formula, find the probabilities at $x = 1,2,3,4$ and 5.		3					
392	5	If two cards are drawn from a pack of 52 cards which are diamonds, using Poisson distribution, find the probability of getting two diamonds at least 3 times in 51 consecutive trials of two cards drawing each time.		3					
393	5	A manufacturer of blades knows that 5% of his product is defective. If he sells blades in boxes of 100, and guarantees that not more than 10 blades will be defective, what is the probability that a box will fail to meet the guaranteed quality?		3					
394	5	Air Corporation having had just 2 air crashes during its first fifty years of existence wants to make the next decade “air crash-free”. Assuming that the same trend will continue, what is the probability of the corporation meeting the target?		3					
395	5	If a random variable has a Poisson distribution such that $P(X = 1) = P(X = 2)$, find (i) the mean of the distribution, (ii) $P(X = 4)$, (iii) $P(X \geq 1)$, and (iv) $P(1 < X < 4)$.		4					
396	5	If X is a Poisson variate such that $P(X = 2) = 9P(X = 4) + 90\ P(X = 6)$. Find (i) the means of X, (ii) the variance of X, (iii) $P(X < 2)$, (iv) $P(X > 4)$, and (v) $P(X \geq 1)$.		5					
397	5	If the probability that an individual suffers a bad reaction from a particular injection is 0.001, determine the probability that out of 2000 individuals (i) exactly three, and (ii) more than two individuals suffer a bad reaction.		3					

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398	5	It is known from past experience that in a certain plant, there are on the average 4 industrial accidents per year. Find the probability that in a given year, there will be less than 4 accidents. Assume Poison distribution.		3					
399	5	Suppose that a local appliances shop has found from experience that the demand for tub lights is roughly distributed as Poisson with a mean of 4 tube lights per week. If the shop keeps 6 tube lights during a particular week, what is the probability that the demand will exceed the supply during that week?		3					
400	5	A manufacturer, who produce medicine bottles, find that 0.1% of the bottles are defective. The bottles are packed in boxes containing 500 bottles. A drug manufacturer buys 100 boxes from the producer of bottles. Using Poisson distribution, find how many boxes will contain (i) No defective bottles and (ii) at least 2 defective bottles.		4					
401	6	A mobile conversation follows an exponential distribution $f\ (x) = \frac{1}{3}e^{-\frac{x}{3}}$. What is the probability that the conversation takes more than 5 minutes?	$e^{-\frac{5}{3}}$	1		$e^{-\frac{5}{3}}$	e^{-15}	$5e^{-15}$	$\frac{e^{-5}}{3}$
402	6	A random variable X has an exponential distribution with probability distribution function is given by $f(x) = 3e^{-3x}$ for $x > 0$ $= 0$ otherwise Find probability that X is not less than 2.	e^{-6}	1		e^{-3}	$e^{-6} - 3$	e^{-6}	$e^{-6} - 1$
403	6	The mean and variance of the density function f (x) = $2e^{-2x}$ are	½ and ¼	1	LJU-2023	½ and ¼	¼ and ½	2 and 4	4 and 2
404	6	If X is random variable which follows an exponential distribution with parameter λ with $P(X \leq 1) = P(X > 1)$, what is $Var(x)$?	$\frac{1}{(\ln 2)^2}$	1	LJU-2022	$\frac{1}{(\ln 2)^2}$	$\frac{1}{2}$	$\frac{1}{(\ln 2)}$	$\frac{1}{\lambda}$
405	6	The annual precipitation data of a city is normally distributed with mean and standard deviation as 1000 mm and 200 mm, respectively. The probability that the annual precipitation will be more than 1200 mm is,	<50%	1	LJU-2023	>50%	<50%	>75%	NONE
406	6	The normal probability density function curve is symmetrical about the mean, μ, i.e., the area to the right ofthe mean is the same as the area to the left of the mean. This means that $P(X < \mu) = P(X > \mu)$ is equal to:	0.5	1		0	1	0.5	0.25
407	6	The range of normal distribution is:	$-\infty$ to ∞	1		0 to n	0 to ∞	-1 to 1	$-\infty$ to ∞
408	6	If $X \sim N(100,64)$, then standard deviation σ is _____.	8	1		100	64	8	36
409	6	If $X \sim N$ (200,49), then standard deviation σ is _____.	7	1		7	49	0	100
410	6	In a standard normal distribution, the area to the left of Z = 1 is:	0.8413	1		0.6413	0.7413	0.8413	0.3413
411	6	If Z is a standard normal variate, then $P(-2.33 \leq Z \leq 2.33)$ is equal to _____.	0.9802	1		0.4901	0.6827	0.9545	0.9802
412	6	If Z is a standard normal variate, then $P(-1.65 \leq Z \leq 1.65)$ is equal to _____.	0.901	1		0.901	0.9520	0.9810	0.99
413	6	If Z is a standard normal variate, then $P(-2.58 \leq Z \leq 2.58)$ is equal to _____.	0.9902	1		0.9951	0.9902	0.4951	0.4949
414	6	If Z is a standard normal variate, then $P(\|Z\| < 1.96)$ is equal to _____.	0.95	1		0.0250	0.4750	0.95	0.9750
415	6	For a normal distribution with $\mu = 10, \sigma = 2$, then probability of a value greater than 10 is _____.	0.5000	1		0.1915	0.3085	0.6915	0.5000

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
416	6	If x is normally distributed with mean 1 and variance 4, then obtain k if $P(x \leq k) = 0.90$	3.56	1		3.56	2.56	1.56	1.645
417	6	The time to pass through a security screening at an airport follows an exponential distribution. The mean time to pass through the security screening is 15 minutes. To catch the flight, a passenger must clear the security screening within 15 minutes. The probability that the passenger will miss the flight is _____.	0.368	1		0.368	1.921	0.863	None of these
418	6	A variable X is exponentially distributed for $x \geq 0$ with a mean of 1. The probability that the value of X will lie between 1 and 2 is _____.	$e^{-1} - e^{-2}$	1		$e^{-1} - e^{-2}$	$e^{1} - e^{-2}$	$e^{-1} - e^{2}$	$e^{-2} - e^{-1}$
419	6	A random variable P follows exponential distribution with mean value 0.5. The expectation of P^2 will be	0.50	1		0.50	$\frac{1}{50}$	0.30	$\frac{1}{30}$
420	6	Normal Distribution is symmetric about…..	Mean	1		Mean	Median	Standard Deviation	Variance
421	6	A personal computer has the length of time between charges of the battery is normally distributed with a mean of 66 hours and a standard deviation of 20 hours. What is the probability when the length of time will be between 58 and 75 hours?	0.329	1		0.595	0.329	0.0443	1.98
422	6	Approximately what area is covered under the normal distribution curve between ± 3 standard deviation?	99.74%	1		88%	68.28%	99.74%	99.45%
423	6	An approximate area covered within two standard-deviation of the mean by standard normal variate is	95.45%	1	LJU-2023	65.25%	68.27%	95.45%	99.74%
424	6	Let X be a normal random variable with mean zero and variance 9. If $a = P(X \geq 3),\ then\ P(\lvert X \rvert \leq 3)$ equal to….	$1 - 2a$	1	LJU-2022	a	$2a$	$1 - a$	$1 - 2a$
425	6	Let X be normal variate with mean 0 and SD 5. If $P(X < 5) = k$ then $P(\lvert X \rvert \geq 5)$ will be	2-2k	1	LJU-2023	1-2k	2-2k	1-k	NONE
426	6	The mean of a normal distribution is the average of the first ten natural numbers then what is the probability of variable between 4 and 7 if $P(X \leq 4) = 1/5$	3/5	1		4/5	2/5	9/10	3/5
427	6	For a standard normal variate, the value of mean is?	0	1		1	0	∞	Not defined
428	6	The standard normal curve is symmetric about the value….	0	1		0.5	1	∞	0
429	6	For a standard normal probability distribution, the mean (μ) and the standard deviation (s)	μ=0 and s=1	1		μ=0 and s=1	μ=16, s=4	μ=25, s=5	μ=100, s=10
430	6	If Y=5X + 10 and X is N (10,25), then mean of Y is?	60	1	LJU-2022	135	50	70	60
431	6	In a company, amount of light bills follows normal distribution with $\sigma = 60$. 11.31% of customers pay bill less than 260.The average amount of light bill is _____.	332.60	1		132.60	223.60	332.60	232.60
432	6	If the distribution of a normal variable is shown as $N(20,4)$ then which of the following intervals includes 99.73% observations?	(14, 26)	1		(13, 39)	(18, 22)	(16, 24)	(14, 26)
433	6	If X is a normal variate with a mean of 30 and an SD of 5, find (i) $P(26 \leq X \leq 40)$ (ii) $P(X \geq 45)$.		2					
434	6	If X is normally distributed with a mean of 2 and an SD of 0.1, find $P(\lvert X - 2 \rvert \geq 0.01)$?		2					
435	6	Assume that the mean height of Indian soldiers is 68.22 inches with a variance of 10.8 inches. How many soldiers in a regiment of 1000 would you expect to be over 6 feet tall?		3					
436	6	The marks obtained by students in a college are normally distributed with a mean of 65 and a variance of 25. If 3 students are selected at random from this college, what is the probability that at		3					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		least one of them would have scored more than 75 marks?							
437	6	If X is normally distributed with a mean and standard deviation of 4, find (i) $P(5 \leq X \leq 10)$ (ii) $P(X \geq 15)$ (iii) $P(10 \leq X \leq 15)$ (iv) $P(X \leq 5)$.		4					
438	6	The compressive strength of samples of cement can be modelled by a normal distribution with a mean 6000 kilograms per square centimeter a standard deviation of 100 kilograms per square centimeter. (i)What is the probability that a sample's strength is less than 6250 Kg/cm²? (ii) What is the probability if sample strength is between 5800 and 5900 Kg/cm²? (iii) What strength is exceeded by 95% of the samples?		4					
439	6	In a photographic process, the developing time of prints may be looked upon as a random variable having the normal distribution with a mean of 16.28 seconds and a standard deviation of 0.12 second. Find the probability that it will take (i) anywhere from 16.00 to 16.50 seconds to develop one of the prints; (ii) at least 16.20 seconds to develop one of the prints; (iii) at most 16.35 seconds to develop one of the prints.		4					
440	6	Weights of 500 students of a college are normally distributed with average weight 95 lbs and standard deviation 7.5. find how many students have the weight between 100 and 110 lbs.		3					
441	6	Let X be random variable with pdf $f(x) = \begin{cases} \frac{1}{5}e^{-\frac{x}{5}} & ; \quad x > 0 \\ 0 & ; \quad x \leq 0 \end{cases}$. Find $(i)P(X > 5)(ii)\ P(3 \leq X \leq 6)$ $(iii)\ mean\ \ (iv)\ variance$		3					
442	6	If the weights of 300 students are normally distributed with a mean of 68 kg and a standard deviation of 3 kg, how many students have weights (i) greater than 72 kg? (ii) less than or equal to 64 kg? (iii) between 65 kg and 71 kg inclusive?		4					
443	6	What is the probability that a standard normal variate Z will be (i) greater than 1.09 ? (ii) less than -1.65? (iii) lying between -1 and 1.96? (iv) lying between 1.25 and 2.75?		4					
444	6	The continuous random variable Z has a standard normal distribution. Calculate the probability of the following. (a) $Z < 1.3$ (b) $Z > 1.3$ (c) $Z > -1.3$ (d) $Z < -1.3$ (e) $-1.37 \leq Z \leq 2.01$ (f) $\lvert Z \rvert \leq 0.5$ (g) $-1.79 \leq Z \leq -0.54$		5					
445	6	<table><tr><td>Class Interval</td><td>11 − 20</td><td>21 − 30</td><td>31 − 40</td><td>41 − 50</td><td>51 − 60</td><td>61 − 70</td><td>71 − 80</td></tr><tr><td>Frequency</td><td>20</td><td>28</td><td>40</td><td>60</td><td>32</td><td>20</td><td>8</td></tr></table>		5					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		Fit a normal curve from the following distribution. It is given that the mean of the distribution is 43.7 and its standard deviation is 14.8.							
446	6	The income distribution of officers of a certain company was found to follow normal distribution. The average income of an officer was Rs. 15,000. The standard deviation of the income of officers was Rs. 5,000. If there were 242 officers drawing salary above Rs. 18,500, how many officers were there in the company?		3					
447	6	The life -time in hours of a certain electrical equipment has the normal distribution with mean = 80 and standard deviation = 16. (i) What is the probability that the equipment lasts at least 100hours? (ii) If the equipment has already lasted 88 hours, what is the conditional probability that it will last at least another 12 hours?		3					
448	6	Find the area under the normal curve in each of the cases (I) In between z = – 0.68 and z = 0; (II) In between z = 0.81 and z = 1.94; and (III) Right of z = –1. 28.		3					
449	6	Fit a normal distribution to the following data. It is given that mean is 165.5 and standard deviation is 15.26. x: 125, 135, 145, 155, 165, 175, 185, 195, 205 f: 1, 1, 14, 22, 25, 19, 13, 3, 2		3					
450	6	A random variable having the normal distribution with$\mu = 18.2, \sigma = 1.25$, find the probabilities that it will take on a value (i) less than 16.5, (ii) Between 16.5 and 18.8.		3					
451	6	Distribution of height of 1000 soldiers is normally distributed with mean 165 cms and standard deviation 15 cms. How many soldiers are of height (i) less than 138 cms (ii) more than 198 cms (iii) between 138 and 198 cms.		3					
452	6	In a normal distribution, 31% item are under 45 and 8% are over 64. Find the mean and SD. Find also, the percentage of items lying between 30 and 75.		5					
453	6	Of a large group of men, 5% are under 60 inches in height and 40% are between 60 and 65 inches. Assuming a normal distribution, find the mean and standard deviation of distribution.		4					
454	6	Of a large group of men, 15% are under 45 inches in height and 70% are between 45 and 65 inches. Assuming a normal distribution, find the mean and standard deviation of distribution.		4	LJU-2023				
455	6	The marks of 1000 students of a university are found to be normally distributed with a mean of 70 and a standard of deviation 5. Estimate the number of students whose marks will be (i) between 60 and 75, (ii) more than 75, and (iii) less than 68.		4					
456	6	The lifetime of a certain batteries has a mean life of 400 hours and the standard deviation as 45 hours. Assuming the distribution of lifetime to be normal, find (i) the percentage of batteries with a lifetime of at least 470 hours, (ii) the proportion of batteries with a lifetime between 385 and 415 hours, and (iii) the minimum life of the best 5% of batteries.		4					
457	6	The marks obtained by students in an examination follow a normal distribution. If 30% of the students		5	LJU-2022				

Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		got marks below 35 and 10% got marks above 60, find the mean and percentage of students who got marks between 40 and 50.							
458	6	Find the mean and standard deviation in which 7% of items are under 35 and 89% are under 63.		4					
459	6	If X is a normal variate with a mean of 120 and a standard deviation of 10, fine c such that (1) $P(X > c) = 0.02$ and (2) $P(X < c) = 0.05$		4					
460	6	If X is a normal variate with a mean of 25 and SD of 5, Find the value of $X = x_1$ such that $P(X \leq x_1) = 0.01$		4					
461	6	Fit a normal distribution to the following data: Class: 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 | 90-95 | 95-100 Frequency: 3 | 21 | 150 | 335 | 326 | 135 | 26 | 4		4					
462	6	In an examination, it is laid down that a student passes if he secures 40% or more. He is placed in the first, second and third division according to whether he secures 60% or more marks, between 50% and 60% marks and between 40% and 50% marks respectively. He gets a distinction in case he secures 75% or more. It is noticed from the result that 10% of the students failed in the examination, whereas 5% of them obtained distinction. Calculate the percentage of students placed in the second division. (Assume Normal Distribution of marks.)		4					
463	6	A random variable has pdf $f(x) = ce^{-2x}, x > 0$. Find (i) $P(X > 2)$ (ii) $P\left(X < \frac{1}{c}\right)$.		3					
464	6	The mileage which car owners get with a certain kind of radial tire is a random variable having an exponential distribution with mean 4000 km. Find the probabilities that one of these tires will last (i) at least 2000 km (ii) at most 3000 km.		3					
465	6	The average time it takes to serve a customer at a petrol pump is 6 minutes. The service time follows exponential distribution. Calculate the probability that (i) A customer will take less than 2 minutes to complete the service. (ii) A customer will take between 4 and 5 minutes to get the service. (iii) A customer will take more than 10 minutes for his service.		4					
466	6	The daily consumption of milk in excess of 20000 gallons is approximately exponentially distributed $\lambda = \frac{1}{3000}$. The city has a daily stock of 35000 gallons. What is the probability that of 2 days selected at random, the stock is insufficient for both the days?		4					
467	6	The lifetime T of an alkline battery is exponentially distributed with $\lambda = 0.05$ per hour. (a) What are the mean are standard deviation of the battery's lifetime? (b) What are the probabilities for the battery to last between 10 and 15 hours and to last more than 20 hours?		4					

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Sr. No.	**unit_ number**	**Question text**	**Answer**	**Marks**	**Previous Year**	**Option 1**	**Option 2**	**Option 3**	**Option 4**
468	6	The time between breakdown of a particular machine follows an exponential distribution with a mean of 17 days. Calculate the probability that a machine breaks down in a 15 day period.		3					
469	6	The time (in hours) required to repair a machine is exponentially distributed with parameter $\lambda = \frac{1}{2}$. (i) What is the probability that the repair time exceed 2 hours? (ii) What is the conditional probability that a repair takes at least 11 hours given that its direction exceeds 8 hours?		3					
470	6	The amount of time that a watch will run without having to be reset is a random variable having an exponential distribution with mean 120 days. Find the probability that such a watch will (a) have to be set in less than 24 days. (b) not have to be reset in at least 180 days.		4					
471	6	The Life length X of an electronic component follows an exponential distribution. These are 2 Processes by which the component may be manufactured. The Expected life length of component is 100 hrs if process I is used to manufacture while it is 150 hrs if process II is used. The cost of manufacturing a single component by process I is Rs. 10, while is Rs.20 for Process II. Moreover, if the component lasts less than the guaranteed life of 200 hrs, a loss of Rs. 50 is to be borne by the manufacturer. Which process is Advantageous to the manufacturer?		5	LJU-2022 LJU-2023				
472	6	The length of the shower on a tropical island during rainy season has an exponential distribution, with parameter $\lambda = 2$, time being measured in minutes. What is the probability that a shower will last more than three minutes? If a shower has already lasted for 2 minutes, what is the probability that it will last for at least one more minute?		3					
473	6	The life of an electronic component follows exponential distribution with a mean of 4 years. The manufacturer of this component gives a replacement warranty of warranty of 3 years. (a) What proportion of components will be replaced in the period of warranty? (b) What is the probability that a randomly selected component will have life within two standard deviations of the mean life?		4					
474	6	If the density function of a continuous random variable X is $f(x) = ce^{-b(x-a)},\ a \le x,$ where a, b, c are constants. Show that $b = c = \frac{1}{\sigma}\ and\ a = \mu - \sigma, where\ \mu = E(X)\ and\ \sigma^2 = Var(X)$.		5					
475	6	If X isan exponentially distributed random variable with parameter λ, find the value of k such that $P(X > k) = aP(X \le k)$		3					
476	6	The length of time X to complete a job is exponentially distributed with $E(X) = \mu = 10$ hours. (i) Compute the probability of job completion between two consecutive jobs exceeding 20 hours. (ii) The cost of job completion is given by $C = 4 + 2X + 4X^2$. Find the expected value of C.		3					
477	7	A quality control expert is required to estimate the mean thickness of aluminum sheets used in the	(0.0454, 0.0506)	1		(0.0454, 0.0506)	(0.1464, 0.1516)	(0.6545, 0.8478)	(0.0641, 0.0825)

Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		production of airframes. A sample of 100 sheets reveals a mean of 0.048 inches with a standard deviation of 0.01 inches. The 99 per cent confidence interval is _____.							
478	7	The point where the Null Hypothesis gets rejected is called as?	Critical Value	0.5		Significant Value	Rejection Value	Acceptance Value	Critical Value
479	7	In a random sample of 180 workers exposed to a certain amount of radiation, 19 experienced some ill effects. 99% confidence interval for the corresponding true percentage is_____	(0.0466, 0.1646)	1		(0.0512, 0.1732)	(0.0466, 0.1646)	(0.4660, 0.1646)	(0.5120, 0.1732)
480	7	A random sample of 300 shoppers at a supermarket includes 204 who regularly uses cents off coupons. In another sample of 500 shoppers at a supermarket includes 75 who regularly uses cents off coupons. Obtain 95% confidence limits for the difference in the population proportions.	(0.469, 0.591)	1		(0.469, 0.591)	(0.053, 0.968)	(0.591, 0.947)	(0.875, 1.435)
481	7	In a random sample of 160 Worker exposed to a certain amount of radiation, 24 experienced some ill effects. What is a 95% confidence limit interval for corresponding true percentage?	(0.0947, 0.2053)	1	LJU-2022	(0.0947, 0.2053)	(0.947, 0.0205)	(0.15, 0.85)	(1.96, 2.58)
482	7	Before an increase in excise duty on tea, 800 people out of a sample of 1000 were consumers Of tea. After an increase in excise duty, 800 people were consumers of tea in a sample of 1200 persons. On the claim of significant decrease in the consumption of tea after the Increase in duty what is your alternative hypothesis and value of Z (Test statistics)?	$P_1 > P_2$, $Z = 6.84$	1	LJU-2022	$p_1 = p_2$, $Z = 2.64$	$P_1 = P_2$, $Z = 6.84$	$p_1 < p_2$, $Z = 6.84$	$P_1 > P_2$, $Z = 6.84$
483	7	Assume the cholesterol level in a certain population have mean $\mu = 200$ and standard daviation $\sigma = 24$ the cholesterol level from a random sample of n=9 indivisual are measured and the sample mean $\bar{x}$ is determined what is the z-score for simple mean $\bar{x} = 180$	-2.50	1		-3.75	-2.50	-0.83	2.50
484	7	A coin was tossed 960 times and returned heads 183 times. Test the hypothesis that the coin is unbiased. Use a 0.05 level of significance.		4					
485	7	A dice is tossed 960 times and it falls with 5 upwards 184 times. Is the dice unbiased at a level of significance of 0.01?		4					
486	7	A die is thrown 600 times and the digit 2 or 4 is considered as success. Digit 2 or 4 are obtained for 212 times. Is a die unbiased?		4					
487	7	A manufacturer claims that at least 95% of the equipment which he supplied to a factory conformed to specification. An examination of a sample of 200 pieces of equipment revealed that 18 were faulty. Test his claim at 5% level of significance.		4					
488	7	In a hospital 480 female and 520 male babies were born in a week. Do these figures confirm the hypothesis that males and female were born in equal numbers?		4					
489	7	In a study designed to investigate whether certain detonators used with explosive in a coal mining meet the requirement that at least 90% will ignite the explosive when charged. It is found that 174 of 200 detonators function properly. Test the null hypothesis $P = 0.9$ against the alternative hypothesis $P < 0.9$ atthe 0.05 level of significance.		4					
490	7	A salesman in a departmental store claim that at most 60 percent of the shoppers entering the store leave without making a purchase. A random sample 50 shoppers showed that 35 of them left without making a purchase. Are these sample results consistent with the claim of the salesman? Use a level of significance of 0.05.		4					
491	7	The fatality rate of typhoid patients is believed to be 17.26%. In a certain year 640 patients suffering from typhoid were treated in a metropolitan		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		hospital and only 63 patients died. Can you consider the hospital efficient at 1% level of significance?							
492	7	In a big city, 325 men out of 600 were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers?		4					
493	7	A manufacturer claims at least 95% of the items he produces are failure free. Examinations of a random sample of 600 items showed 39 to be defective. Test the claim at a significance level of 0.05.		4					
494	7	In a sample of 1000 in Karnataka, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance?		4					
495	7	Marketers believe that 92% of adults in the United States own a cell phone. A cell phone manufacturer believes that number is actually lower. 200 American adults are surveyed, of which, 174 report having cell phones. Use a 5% level of significance. State the null and alternative hypothesis, state your conclusion.		4					
496	7	A sample of 600 persons selected at random from a large city shows that the percentage of male in the sample is 53%. It is believed that male to the total population ratio in the city is $\frac{1}{2}$. Test whether this belief is confirmed by the observation.		4					
497	7	A survey claims that 9 out of 10 doctors recommend aspirin for their patients with headaches. To test this claim, a random sample of 100 doctors is obtained. Of these 100 doctors, 82 indicate that they recommend aspirin. Is this claim accurate at 5% level of significance?		4					
498	7	Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence 200 men and 325 women were in favor of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same at 5% level of significance.		4					
499	7	In a city A, 20% of a random sample of 900 school boys has a certain slight physical defect. In another city B, 18.5% of a random sample of 1600 school boys has the same defect. Is the difference between the proportions significant at 0.05 level of significance?		4					
500	7	Before an increase in excise duty on tea, 800 people out of a sample of 1000 were consumers of tea. After an increase in excise duty, 800 people were consumers of tea in a sample of 1200 persons. Find whether is significant decrease in the consumption of tea after the increase in duty.		4					
501	7	15.5% of a random sample of 1600 undergraduates' smokers, whereas 20% of a random sample of 900 postgraduates were smokers in a state. Can we conclude that less number of undergraduates are smokers than the postgraduates?		4	LJU-2023				
502	7	A machine produced 20 defective articles in a batch of 400. After overhauling it produced 10 defective articles in a batch of 300. Has the machine improved?		4					
503	7	Time magazine reported the result of a telephone poll of 800 adult Americans. The question posed of the Americans who were surveyed was: "Should the federal tax on cigarettes be raised to pay for health care reform?" The results of the survey were: Non- Smokers | Smokers $n_1 = 605$ | $n_2 = 195$		4					

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Sr. No.	**unit_ number**	**Question text**	**Answer**	**Marks**	**Previous Year**	**Option 1**	**Option 2**	**Option 3**	**Option 4**
		$y_1 = 351$ said 'yes' | $y_2 = 41$ said 'yes' Is there sufficient evidence at the $= 0.05$, say, to conclude that the two populations — smokers and non-smokers — differ significantly with respect to their opinions?							
504	7	In two large populations, there are 30% and 25% fair haired people respectively. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations?		4					
505	7	A company has the head office at Kolkata and a branch at Mumbai. The personnel director wanted to know if the workers at the two places would like the introduction of a new plan of work and a survey was conducted for this purpose. Out of a sample of 500 workers at Kolkata, 62% favoured the new plan. At Mumbai, out of a sample of 400 workers, 41% were against the new plan. Is there any significant difference between the two groups in their attitude towards the new plan at 5% level?		4					
506	7	On the basis of their total scores, 200 candidates of a civil service examination are divided into two groups, the upper 30% and the remaining 70%. Consider the first question of the examination. Among the first group ,40 had the correct answer, whereas among the second group,80 had the correct answer. On the basis of this question likely to be useful for discriminating the ability of the type being tested?		4					
507	7	A teacher believes that 85% of students in the class will want to go on a field trip to the local zoo. She performs a hypothesis test to determine if the percentage is the same or different from 85%. The teacher samples 50 students and 39 reply that they would want to go to the zoo. For the hypothesis test, use a 5% level of significance.		4					
508	7	A random sample of 100 Indians has an average life span of 71.8 years with standard deviation of 8.9 years. Can it be concluded that the average life span of an Indian is 70 years?		4					
509	7	The mean life time of sample of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. The company claims that the average life of the bulbs produced by it is 1600 hours. Using the level of significance of 0.05, is the claim acceptable?		4					
510	7	A random sample of 50 items gives the mean 6.2 and variance 10.24. can it be regarded as drawn from a normal population with mean 5.4 at 5% level of significance?		4					
511	7	A random sample of 400 members is found to have a mean of 4.45 cm. can it be reasonably regarded as a sample from a large population whose mean is 5 cm and variance is 4 cm?		4					
512	7	A sample of 900 members has a mean of 3.4 cm and SD 2.61 cm. Is the sample from a large population of mean 3.25 cm and SD 2.61 cm? If the population is normal and its mean is unknown, find the 95% fiducial limits of its true mean.		4					
513	7	A type company claims that the lives of tyres have mean 42000 km with s.d. of 4000 km. A change in the production process is believed to result in better product. A test sample of 81 new tyres has a mean life of 42500 km. test at 5% level of significance that the new product is significantly better than the old one.		4					
514	7	The mean length of the lumber is supposed to be 8.5 feet. A builder wants to check whether the shipment of lumber she receives has a mean length different from 8.5 feet. If the builder observes that		4	LJU-2022				

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		the sample mean of 61 pieces of lumber is 8.3 feet with a sample standard deviation of 1.2 feet. What will she conclude? Is 8.3 very different from 8.5?							
515	7	The mean IQ of a sample of 1600 children was 99. Is it likely that this was a random sample from a population with mean IQ 100 and SD 15.		4					
516	7	The mean breaking strength of cables supplied by a manufacturer is 1800 with standard deviation 100. By a new technique in the manufacturing process, it is claimed that the breaking strength of the cable has increased. In order to test the claim a sample of 50 cables is tested. It is found that the mean breaking strength is 1850. Can we support the claim at 1% level of significance?		4					
517	7	It is claimed that a random sample of 49 types have a mean life of 15200 km. This sample was drawn from a population whose mean is 15150 km and a standard deviation of 1200 km. Test the significance at 0.05 level.		4					
518	7	Test the significance of the difference between the means of two normal population with the same standard deviation from the following data: Size / Mean / SD Sample I: 100 / 64 / 6 Sample II: 200 / 67 / 8		4					
519	7	The mean of simple samples of sizes 1000 and 2000 are 67.5 and 68 cm respectively. can the samples be regarded as drawn from the same population of S.D. 2.5 cm.		4					
520	7	The mean life of a sample of 10 electric bulbs was found to be 1456 hours with SD of 423 hours. A second samples of 17 bulbs chosen from a different batch showed a mean life of 1280 with SD of 398 hours. Is there a significant difference between the means of two batches?		4					
521	7	The average of marks scored by 32 boys is 72 with standard deviation 8 while that of 36 girls is 70 with standard deviation 6. Test at 1% level of significance whether the boys perform better than the girls.		4					
522	7	A simple sample of heights of 6400 english men has a mean of 170 cm and a s.d. of 6.4 cm, while a simple sample of heights of 1600 Americans has a mean of 172 cm and a s.d. of 6.3 cm. do the data indicate that American are, on the average, taller than the English men?		4					
523	7	In a certain factory there are two different processes of manufacturing the same item. The average weight in a sample of 250 items produced from one process is found to be 120 gm with a s.d. of 12 gm; the corresponding figures in a sample of 400 items from the other process are 124 gm and 14 gm. Is this difference between the two sample means significant?		4					
524	7	The mean height of 50 male students who participate in sports is 68.2 inches with a s.d. of 2.5 inches. The mean height of 50 male students who have not participated in sport is 67.2 inches with a s.d. of 2.8 inches. Test the hypothesis that the height of students who have participated in sports is more than the students who have not participated in sports.		4					
525	7	A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group, there are 150 students having mean IQ of 75 with a SD of 15. In the second group there are 250 students having mean IQ of 70 with SD of 20. Test at 1% level of		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		significance whether the groups have come from same population.							
526	7	In order to make a survey of the buying habits, two markets A and B are chosen at two different parts of a city. 400 women shoppers are chosen at random in market A. Their average daily expenditure on food is found to be $Rs.250$ with standard deviation of $Rs.40$. The figures are $Rs.220$ and $Rs.55$ respectively in the market B where also 400 women shoppers are chosen at random. Test at 1% level of significance whether the average daily food expenditure of the two populations of shoppers are equal.		4					
527	7	Two types of batteries are tested for their length of life and the following data is obtained. | | No of samples | Mean life (hours) | Variance | | Type A | 9 | 500 | 100 | | Type B | 8 | 540 | 121 | Is there a significant difference in the two means?		3					
528	7	A buyer of electric bulbs bought 100 bulbs each of two famous brands A and B. Upon testing both these samples, he found that brand A had a mean life of 1500 hours with a standard deviation of 50 hours whereas brand B had an average life of 1530 hours with a standard deviation of 60 hours. Can it be concluded at 5% level of significance that the two brands differ significantly in quality?		3					
529	7	The SD of a random samples of 1000 is found to be 2.6 and the SD of another random sample of 500 is 2.7. Assuming the samples to be independent, find whether the two samples could have come from populations with the same SD.		4					
530	7	Random samples drawn from two countries gave the following data relating to the heights of adult males: | | Country A | Country B | | Standard deviation (in inches) | 2.58 | 2.50 | | Number in samples | 1000 | 1200 | Is the difference between the standard deviation significant?		4					
531	7	The SD of a random sample of 900 members is 4.6 and that of another independent sample of 1600 members is 4.8. Examine if the two samples could have been drawn from a population with SD 4?		4	LJU-2022				
532	7	The variance of a random sample of 125 members is 11.56 and that of another independent sample of 175 members is 14.44. Test if the two samples could have been drawn from a same population at 1% level of significance?		4	LJU-2023				
533	7	Explain whether the two samples for which the data are given in the following table could have been drawn from populations with the same SD. | | Size | SD | | Sample I | 100 | 5 | | Sample II | 200 | 7 |		4					
534	7	A college claims that its average class size is 35 students. A random sample of 64 classes has a mean size of 37 students with a standard deviation of 6 students. Test at the $= 0.05$ level of significance if the claimed value is too low.		4					
535	7	A political party claims that 45% of the voters in an election district prefer its candidate. A sample of 200 voters include 80 who prefer this candidate. Test if the claims is valid at the 5% significance level.		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
536	7	A stenographer claims that she can type at the rate of 120 words per minute. She demonstrated, on the basis of 100 trials, an average speed of 116 words with a standard deviation of 15 words. Does this enable us to reject the null hypothesis $\mu = 120$ against the alternative hypothesis $\mu < 120$ at the 0.05 level of significance?		4					
537	7	If 57 out of 150 patients suffering from certain disease are cured by allopathy and 33 out 0f 100 patients with the same disease are cured by homeopathy. Is there reason to believe that allopathy is better than homeopathy at 0.05 level of significance?		4					
538	7	The mean yield of two sets of plots and their variability are as given below. Examine whether the difference in the variability in yields is significant at 5% level of significance. Set of 40 plots / Set of 60 plots Mean yield per plot: $1258\ lb$ / $1243\ lb$ Standard Deviation per plot: 34 / 28		4					
539	7	500 units from a factory are inspected and 12 are found to be defective, 800 units from another factory are inspected and 12 are found to be defective. Can it be concluded at 5% level of significance that production at second factory is better that in first factory.		4					
540	7	In an advertisement, a pizza shop claims that the mean delivery is less than 30 minutes. A random selection of 36 delivery times a sample mean of 28.5 minutes and a standard deviation of 3.5 minutes. Is there enough evidence to support the claim at 5%?		4	LJU-2023				
541	8	A random sample of 10 pairs of observation has mean and variance are 160 and 16 respectively. What are the 95% confidence limits the population?	(156. 984, 163. 016)	1		(156. 984, 163. 016)	(120. 371, 159. 190)	(147. 101, 150. 924)	(150. 283, 165. 942)
542	8	Arrange the following steps in the process of hypothesis testing in proper sequence (a) Select level of significance (b) Setup null and alternative hypothesis (c) Establish the decision rule (d) Performance computations (e) Select test statistics (f) Draw conclusion Choose the correct answer from the options given below	B,A,E,C, D,F	1		A,B,C,D,E,F	A,B,E,D,C,F	B,A,E,C,D, F	B,A,C,D,E,F
543	8	In order to examine the significance of difference between any two small samples means, a researcher follows	T test	1	LJU-2023	F test	T test	Z test	Chi-square test
544	8	What is the mean of a Chi Square distribution with 18 degrees of freedom?	18	1		18	9	17	10
545	8	The variance of a Chi Square distribution with sample size 9 is _____.	16	1	LJU-2022 LJU-2023	2	4	10	16
546	8	A random sample of size 16 has mean 53. The sum of squares of deviations from mean is 150. 95% confidence limits for the mean is _____.	(51.315, 54.686)	1	LJU-2022	(49.314, 52.316)	(51.315, 54.686)	(51.982, 53.789)	(50.123, 54.987)
547	8	The range of chi-square variate is	0 to ∞	1		$-\infty$ to ∞	0 to ∞	0 to 1	-1 to 1
548	8	A dice was thrown 264 times and the following frequencies were observed: No obtained: 1 / 2 / 3 / 4 / 5 / 6 Frequency: 40 / 32 / 28 / 50 / 54 / 60	18.36	1		18.36	14.36	15.36	17.36

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Sr. No.	**unit_ number**	**Question text**	**Answer**	**Marks**	**Previous Year**	**Option 1**	**Option 2**	**Option 3**	**Option 4**
		The calculate value of chi-square at 5% level of significance is							
549	8	A sample of 26 bulbs gives a mean life of 990hrs with a SD of 20 hrs. the manufacturer claims that the mean life of bulbs is 1000 hrs. Is the sample not up to standard?		4					
550	8	The average breaking strength of the steel rods is specified to be 18.5 thousand pounds. To test this, sample of 14 rods were tested. The mean and SD obtained were 17.85 and 1.955 respectively. Is the result of experiment significant?		3					
551	8	A soap manufacturing company was distributing a particular brand of soap through a large number of retail shops. Before a heavy advertisement campaign, the mean sales per week per shop were 140 dozen. After the campaign, a sample of 26 shops was taken and the mean sale was found to be 147 dozen with standard deviation 16. Can you consider the advertisement effective?		4					
552	8	A sample of 20 items has mean 42 units and standard deviation 5 units, test the hypothesis that it is a random sample from a normal population with mean 45 units.		4					
553	8	A random sample of size 16 from a normal population showed a mean of 103.75 cm and sum of square of deviation from the mean 843.75 cm^2 can we say that the population has a mean of 108.75 cm.		4					
554	8	A random sample of six steels beams has mean compressive strength of 58392 psi (pounds per square inch) with a SD of 648 psi use this information and level of significance $\propto = 0.05$ to test whether the true average compressive strength of the steel from which this sample came is 58000 psi. Assume normality.		4					
555	8	A machine is designed to produce insulating washers for electrical devices of average thickness of 0.025 cm. A random sample of 10 washers was found to have an average thickness of 0.024 cm with S.D of 0.002 cm. test the significance of the deviation.		4					
556	8	The mean lifetime of a sample of 25 bulbs is found as 1550 hrs with a SD of 120 hrs. The company manufacturing the bulbs claim that the average life of their bulbs is 1600hrs is the claim acceptance at 5% level of significance?		4					
557	8	A random sample from a company's very extensive files shows that orders for a certain piece of machinery were filled, respectively, in 10, 12, 19, 14, 15, 18, 11 and 13 days. Use the level of significance $\propto = 0.01$ to test the claim that on average such orders are filled in 10.5 days. Choose the alternative hypothesis so that rejection of the null hypothesis $\mu = 10.5$ implies that it takes longer than indicated. Assume normality.		4					
558	8	A random sample of 10 boys had the following IQs: - 70,120,110,101,88,83,95,98,107 and 100. (a) Do these data support the assumption of a population mean IQ of 100? (b) Find 95% confidence limits for the mean IQ?		4					
559	8	Ten objects are chosen at random from a large population and their weight are found to be in gms:- 63,63,64,65,66, 69, 69, 70, 70, 71 discuss the suggestion that mean weight is 65 kg.		4					
560	8	The height of 10 males of a given locality are 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 inches is it reasonable to believe that the average height is greater than 64 inches. Test at 5% significance level.		4					
561	8	A courier service advertises that its average		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		delivery time is less than 5 hrs. for local deliveries. A random sample of 10 for the amount of time this courier service takes to deliver packages to an address across town produced the following times: 8, 3,4,7,10,5,6,4,5,8. Is this evidence support the claim of the courier service at 5% level of significance?							
562	8	Ten bearing made by a certain process have a mean diameter of 0.506 cm and a SD 0.004 cm Assuming that the data may be looked upon as a random variable from a normal population construct a 95% confidence interval for the actual average diameter of bearing made by this process.		4					
563	8	The height of 10 males of a given locality are found to be 175, 168, 155, 170, 152, 170, 175, 160, 160 and 165 cms. Based on this sample of 10 items, Test the hypothesis that the mean height of males is 170 cms. Also find 95% confidence limits for the height of males in that locality.		3					
564	8	Samples of size 10 & 14 were taken from two normal populations with standard deviation 3.5 & 5.2 the sample means were found to be 20.3 & 18.6. Test whether the mean of two population are same at 5% level.		4					
565	8	Two HEAD samples of 8 & 7 items respectively had the following values of the variable (weight in kg.) Sample I: 9, 11, 13, 11, 15, 9, 12, 14 SampleII: 10, 12, 10, 14, 9, 8, 10 Do the two estimates of population variance differ significantly?		4					
566	8	Two samples of size 9 & 8 give the sum of squares of deviations from their respective means equal 160 inches & 91 inches square respectively. Can they be regarded as drawn from two normal populations with the same variance.		4					
567	8	A random sample of 10 nations gives a correlation coefficient of 0.5 between literacy rate and political stability. Is the relationship significant?		4					
568	8	The following figures refer to observations in live independent samples Sample I: 25, 30, 28, 34, 24, 20, 13, 32, 22, 38 Sample II: 40, 34, 22, 20, 31, 40, 30, 23, 36, 17 Analyses whether the samples have been drawn from the population of equal means test whether the means of two populations are same at 5% level.		4					
569	8	To examine the hypothesis that the husbands are more intelligent than wives, an investigator took sample of two couples and administered them a test which measures the IQ. The results are as follows: Husbands: 117, 105, 97, 105, 123, 109, 86, 78, 103, 107 wives: 106, 98, 87, 104, 116, 95, 90, 69, 108, 85 Test the hypothesis with reasonable test level of significance of 0.05		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
570	8	A random sample of 27 pairs of observations from a bivariate normal population gives a correlation coefficient of 0.42. Is it likely that the variable are uncorrelated in the population?		4					
571	8	Find the least value of r in a sample of 27 pairs from a bivariate normal population which is significant at 5% level.		3					
572	8	Find the least value of r in samples of 18 pairs of observations from a bivariate normal population, which is significant at 5% level		3					
573	8	The means of two random samples of sizes 9 and 7 are 196.42 and 198.82 respectively. The sums of squares of the deviation from the mean are 26.94 and 18.73 respectively. Can the sample be considered to have been drawn from the same population?		3					
574	8	A random sample of 18 pairs of observation from a bivariate normal population gives a correlation coefficient of 0.3 is it likely that variables are uncorrelated in the population?		3					
575	8	A certain injection administered to 12-patients resulted in the following changes of blood pressure: 5, 2, 8, -1, 3, 0, 6, -2, 1, 5, 0, 4. Can it be concluded that the injection will be in general accompanied by an increase in blood pressure?		3					
576	8	The mean height and SD height of 8 randomly chosen soldiers are 166.9 cm and 8.29 cm respectively. The corresponding values of 6 randomly chosen sailors are 170.3 cm and 8.50 cm respectively. Based on this data, can we conclude that soldiers are, in general, shorter than sailors?		4					
577	8	The sales in 6 shops before and after "the more sale campaign" are shown below: Shop 1 2 3 4 5 6 Sales before Campaign 53 28 32 48 50 42 Sales after Campaign 58 32 30 50 56 45 Can we say that the campaign is successful?		3	LJU-2023				
578	8	Two samples are drawn from two normal populations. From the following data test whether the two samples have the same variance at 5% level? Sample I 60 65 71 74 76 82 85 87 Sample II 61 66 67 85 78 63 85 86 88 91		4					
579	8	Two nicotine contents in two random samples of tobacco are given below: Sample I 21 24 25 26 27 Sample II 22 27 28 30 31 36 Can we say that two samples came from the same population?		4	LJU-2022				

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
580	8	Two random samples are drawn from two populations and the following results were obtained: Sample I: 16, 17, 18, 19, 20, 21, 22, 24, 26, 27 Sample II: 19, 22, 25, 25, 26, 28, 29, 30, 31, 32, 35, 36 Find the variances of the two samples and test whether the two populations have the same variances.		4					
581	8	The time taken by workers in performing a job by method I and method II is given below Method I: 20, 16, 26, 27, 22 Method II: 27, 33, 42, 35, 32, 34, 38 Do the data show that the variance of time distribution in a population from which these samples are drawn do not differ significantly?		4					
582	8	A group of 10 rats fed on diet A and another group of 8 rats fed o diet B recorded following increase in weight: Diet A: 5, 6, 8, 1, 12, 4, 3, 9, 6, 10 Diet B: 2, 3, 6, 8, 1, 10, 2, 8 Find, if the variances are significantly different?		4					
583	8	In a test given to two groups of students drawn from two normal populations, the marks obtained were as follows: Group I: 18, 20, 36, 50, 49, 36, 34, 49, 41 Group II: 29, 28, 26, 35, 30, 44, 46 Examine at 5% level, whether the two populations have the same variances.		4					
584	8	The standard deviations calculated from two random samples of sizes 9 & 13 are 2.1 & 1.8 respectively. Can the samples be regarded as drawn from normal populations with the same SD?		4					
585	8	In two independent samples of sizes 8 & 10, the sum of square of deviations of samples values from the respective means was 84.4 and 102.6. Test whether the difference of variances of the population is significant or not. Use a 0.05 level of significance.		4					
586	8	In a laboratory experiment two samples gave the following results: Sample 1: size 10, Sample Mean 15, Sum of square of deviation from the mean 90 Sample 2: size 12, Sample Mean 14, Sum of square of deviation from the mean 108 Test the equality of sample variances at 5% level of significance.		4					
587	8	Two random samples gave the following data:		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		<table><tr><td></td><td>size</td><td>mean</td><td>variance</td></tr><tr><td>Sample I</td><td>8</td><td>9.6</td><td>1.2</td></tr><tr><td>Sample II</td><td>11</td><td>16.5</td><td>2.5</td></tr></table> Can we conclude that the two samples have been drawn from the same normal population?							
588	8	Following results were obtained from two samples, each drawn from two different population A & B <table><tr><td>Population</td><td>A</td><td>B</td></tr><tr><td>Sample</td><td>I</td><td>II</td></tr><tr><td>Sample size</td><td>15</td><td>17</td></tr><tr><td>Sample SD</td><td>3</td><td>2</td></tr></table> Test the hypothesis that the variance of brand A is more than that of B.		4					
589	8	Five dice are thrown 192 times and the number of times 4,5 or 6 are obtained are as follows: <table><tr><td>No. of dice showing 4,5,6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>Frequency</td><td>6</td><td>46</td><td>70</td><td>48</td><td>20</td><td>2</td></tr></table> Calculate χ^2		4					
590	8	A pair of dice are thrown 360 times and frequency of each sum is given below: <table><tr><td>Sum</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr><tr><td>Freq</td><td>8</td><td>24</td><td>35</td><td>37</td><td>44</td><td>65</td><td>51</td><td>42</td><td>26</td><td>14</td><td>14</td></tr></table> Would you say that the dice are fair on the basis of chi-square test at 0.05 level of significance?		4					
591	8	The following mistakes per page were observed in a book: <table><tr><td>No. of mistakes per page</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>No. of pages</td><td>211</td><td>90</td><td>19</td><td>5</td><td>0</td></tr></table> Fit a Poisson distribution and test the goodness of fit.		4					
592	8	The number of car accidents in a metropolitan city was found to be 20, 17, 12, 6, 7, 15, 8, 5, 16 and 14 per month respectively. Use χ^2test to check whether these frequencies are in agreement with the belief that the occurrence of accidents was the same during 10 months periods. Test at occurrence of accidents was the same during 10 months periods. Test at 5% level of significance.		4					
593	8	200 digits were chosen at random from a set of tables, the frequency of the digits are shown below: <table><tr><td>Digits</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td>frequency</td><td>18</td><td>19</td><td>23</td><td>21</td><td>16</td><td>25</td><td>22</td><td>20</td><td>21</td><td>15</td></tr></table> Use the χ^2-test to access the correctness of the hypothesis that the digits were distributed in equal number in the tables from which these were chosen.		4					
594	8	A die is thrown 276 times and the results of these throws are given below: -		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		Number appeared on the die: 1 | 2 | 3 | 4 | 5 | 6 Frequency: 40 | 32 | 29 | 59 | 57 | 59 Test whether the dies is unbiased.							
595	8	A die is thrown 132 times and the results of these throws are given below: - Number appeared on the die: 1 | 2 | 3 | 4 | 5 | 6 f: 15 | 20 | 25 | 15 | 29 | 28 Test whether the dies is unbiased.		4					
596	8	4 coins are tossed 160 times and the following results were obtained No. of heads: 0 | 1 | 2 | 3 | 4 Observed frequencies: 17 | 52 | 54 | 31 | 6 Under the assumption that coin is balanced, find the expected frequencies of 0, 1,2,3 or 4 heads, and test the goodness of fit.		5					
597	8	Fit a Poisson distribution to the following data and its goodness of fit at level of significance 0.05: X: 0 | 1 | 2 | 3 | 4 f: 419 | 352 | 154 | 56 | 19		4					
598	8	Fit the equation of the best fitting normal curve to the following data: X: 135 | 145 | 155 | 165 | 175 | 185 | 195 | 205 | Total f: 2 | 14 | 22 | 25 | 19 | 13 | 3 | 2 | 100 Compare the theoretical and observed frequencies. Using $\aleph^2$-test find goodness of fit. Given that $\mu = 165.6$ and $\sigma = 15.02$.		4					
599	8	The following table gives the number of accidents in a city during a week. Find the accidents are uniformly distributed over a week. Day: sun | mon | tue | wed | thu | fri | sat | total No. of accidents: 13 | 15 | 9 | 11 | 12 | 10 | 14 | 84		4					
600	8	The distribution of defects in printed circuit board is hypothesized to follow Poisson distribution. A random sample of 60 printed boards shows the following data: No. of defects: 0 | 1 | 2 | 3 Observed frequency: 32 | 15 | 9 | 4 Does the hypothesis of Poisson distribution		4					

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<table>
<tr><th>Sr. No.</th><th>unit_ number</th><th>Question text</th><th>Answer</th><th>Marks</th><th>Previous Year</th><th>Option 1</th><th>Option 2</th><th>Option 3</th><th>Option 4</th></tr>
<tr><td></td><td></td><td>appropriate?</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>601</td><td>8</td><td>Theory predicts that the proportion of beans in the four group A, B, C, D should be 9:3:3:1 In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287 and 118. Does the experimental result support the theory?</td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>602</td><td>8</td><td>Weights in kilograms of 10 students are given below: 38, 40, 45, 53, 47,43, 55, 48, 52, 49 can we say that the mean of the distribution from which the above sample is drawn is 20 kg?</td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>603</td><td>8</td><td>Can vaccination be regarded as preventive measure of smallpox as evidenced by the following data of 1482 persons exposed to smallpox in a locality. 368 in all were attacked of these 1482 persons and 343 were vaccinated and of these only 35 were attacked.</td><td></td><td>4</td><td>LJU-2022</td><td></td><td></td><td></td><td></td></tr>
<tr><td>604</td><td>8</td><td>A set of five similar coins is tossed 320 times and result is obtained as follows:<table><tr><td>No of heads</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Frequency</td><td>6</td><td>27</td><td>72</td><td>112</td><td>71</td><td>32</td></tr></table>Test the hypothesis that the data follow a Binomial distribution.</td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>605</td><td>8</td><td>From the following data, find whether there is any significant linking in the habit of taking soft drinks among the categories of employees.<table><tr><td rowspan="2">Soft drink</td><td colspan="3">Employees</td></tr><tr><td>clerks</td><td>Teachers</td><td>Officers</td></tr><tr><td>Pepsi</td><td>10</td><td>25</td><td>65</td></tr><tr><td>Thums up</td><td>15</td><td>30</td><td>65</td></tr><tr><td>Fanta</td><td>50</td><td>60</td><td>30</td></tr></table></td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>606</td><td>8</td><td>A random sample of 500 students were classified according to economic condition of their family and also according to merit as shown below:<table><tr><td rowspan="2">merit</td><td colspan="3">Economic condition</td><td rowspan="2">total</td></tr><tr><td>rich</td><td>Middle class</td><td>poor</td></tr><tr><td>meritorious</td><td>42</td><td>137</td><td>61</td><td>240</td></tr><tr><td>Not-meritorious</td><td>58</td><td>113</td><td>89</td><td>260</td></tr><tr><td>total</td><td>100</td><td>250</td><td>150</td><td>500</td></tr></table>Test whether the two attributes merit and economic condition are associated or not.</td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>607</td><td>8</td><td>Two researchers adopted different sampling techniques while investigating some group of students falling into different intelligence level. The result are as follows:<table><tr><td>researchers</td><td>Below average</td><td>average</td><td>Above average</td><td>geniuses</td><td>total</td></tr><tr><td>X</td><td>86</td><td>60</td><td>44</td><td>10</td><td>200</td></tr><tr><td>Y</td><td>40</td><td>33</td><td>25</td><td>2</td><td>100</td></tr><tr><td>total</td><td>126</td><td>93</td><td>69</td><td>12</td><td>300</td></tr></table>Would you say that the sampling techniques adopted by the two researchers are significantly different?</td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
608	8	Records taken of the number of male and female births in 830 families having four children are as follows: Number of male births: 0, 1, 2, 3, 4 Number of female births: 4, 3, 2, 1, 0 Number of families: 32, 178, 290, 236, 94 Test whether the data are consistent with the hypothesis that the Binomial law holds and the chance of male birth is equal to that of female birth, namely p = q = 1/2.		4					
609	8	A total of 3759 individuals were interviewed in a public opinion survey on a political proposal. Of them 1872 were men and the rest were women. A total of 2257 individuals were in favor of the proposal and 917 were opposed to it. A total of 243 men were undecided and 442 women were opposed to it. Do you justify or contradict the hypothesis that there is no association between knowledge and attitude at 5% level of significance?		4					
610	8	A drug X claimed to be effective in curing colds. In an experiment on 500 persons with cold, half of them were given the drug X and half of them were given placebo (sugar pills). The patient's reactions to the treatment are recorded in the following table: Treatment / Helped / Reaction / No effect / Total Drug / 150 / 30 / 70 / 250 Placebo / 130 / 40 / 80 / 250 Total / 280 / 70 / 150 / 500 Can it be concluded that there is a significant difference in the effect of drug X and placebo?		3	LJU-2023				
611	9	Fit the straight line to the following data: x: 1, 2, 3 y: 1, 2, 3	$y = x$	1	LJU-2023	$y = x$	$y = x + 1$	$y = 2x$	$y = 2x + 1$
612	9	Fit the straight line to the following data: x: 0, 5 y: 7, 11	$y = 0.8x + 7$	1		$y = 0.94x + 6.6$	$y = 0.04x + 5$	$y = 0.8x + 7$	$y = 5.6x + 0.04$
613	9	Fit a straight line for the given pairs of (x, y) which are $(0,3), (1,6)$.	$y = 3 + 3x$	1		$y = 4 + 3x$	$y = 3.52 + 2.26x$	$y = 3 + 3x$	$y = 2.26x$
614	9	If the normal equations for a straight-line $y = ax + b$ are $26 = 4a + 6b$ and $34 = 6a + 4b$ then fit the above straight line.	$y = 5x + 1$	1	LJU-2022	$y = 5x - 1$	$y = 5x + 1$	$y = x + 5$	$y = x - 5$
615	9	If the normal equations for a straight-line $y = a + bx$ are $12 = 8a - 6b$ and $12 = -6a + 54b$ then fit the above straight line.	$y = 1.8182 + 0.4242x$	1		$y = -1.8182 + 0.4242x$	$y = 1.8182 - 0.4242x$	$y = -1.8182 - 0.4242x$	$y = 1.8182 + 0.4242x$
616	9	Fit the parabola $y = a + bx + cx^2$, if their normal equations are $9a + 60c = 11$, $60b = 51$ and $60a + 708c = -9$.	$y = 3.0042 + 0.85x$ - $0.2673x^2$	1	LJU-2022	$y = -3.0042 + 0.85x - 0.2673x^2$	$y = 0.85 + 3.0042x - 0.2673x^2$	$y = -0.85 + 3.0042x - 0.2673x^2$	$y = 3.0042 + 0.85x - 0.2673x^2$
617	9	What would be the value of the co-efficient of x when you fit a quadratic curve to the given data? x: 1, 2, 3, 4 y: 1.7, 1.8, 2.3, 3.2	-0.5	1		-0.5	2	1	0

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
618	9	If the normal equations for a straight-line $y = a + bx$ are $135 = 6a + 21b$ and $561 = 21a + 91b$ then fit the above straight line.	$y = 4.8 + 5.05x$	1		$y = 4.8 - 5.05x$	$y = 3.2 - 5x$	$y = 4.8 + 5.05x$	$y = -3.2 + 5x$
619	9	Fit the parabola $y = a + bx + cx^2$, if their normal equations are $5a + 10b + 30c = 30,\ 10a + 30b + 100c = 120,\ 30a + 100b + 354c = 434$	$y = -4 + 2x + x^2$	1		$y = 4 + 2x - x^2$	$y = 4 + x + 2x^2$	$y = -4 - 2x + x^2$	$y = -4 + 2x + x^2$
620	9	If the normal equations for a straight-line $y = a + bx$ are $204 = 5a + 15b$ and $748 = 15a + 55b$ then fit the above straight line.	$y = 13.6x$	1		$y = x$	$y = -13.6x$	$y = 13.6x$	$y = -13.6$
621	9	What would be the coefficient of x^2 when you fit a quadratic curve to the following data? x: 70, 20, 10 y: 20, 70, 90	0.0167	1	LJU-2023	0.0167	113.3	-2.5	1.5
622	9	Find the relation of the type $R = aV + b$, when some values of R and V obtained from an experiment are V: 60, 65, 70, 75, 80, 85, 90 R: 109, 114, 118, 123, 127, 130, 133		3					
623	9	The results of a measurement of electric resistance R of a copper bar at various temperatures $t^{\circ}C$ are listed below: $t^{\circ}C$: 19, 25, 30, 36, 40, 45, 50 R: 76, 77, 79, 80, 82, 83, 85 Find a relation $R = a + bt$ where a and b are constants to be determined.		3					
624	9	If P is the pull required to lift a load W by means of a pulley block, find a linear law of the form $P = mW + C$ connecting P & W using the following data. P: 12, 15, 21, 25 W: 50, 70, 100, 120 Where$P$ & W are taken in $kg - wt$. Compute P when $W = 150\ kg$		3					
625	9	Fit a straight line to the given data regarding x as the independent variable. x: 1, 2, 3, 4, 5, 6 y: 1200, 900, 600, 200, 110, 50		3					
626	9	If $f(x)$ is a linear curve such that $f(0) = -3,\ f(1) = 6,\ f(2) = 8$ then find $f(x)$ using least square method. Also find $f(8)$.		3					
627	9	A simply supported beam carries a concentrated load $P(lb)$ at its midpoint. Corresponding to various values of P, the maximum deflection $Y(in)$ is measured. The data is given below. P: 100, 120, 140, 160, 180, 200 Y: 0.45, 0.55, 0.60, 0.70, 0.80, 0.85 Find a law of the form $Y = a + bP$ using the least square method.		3	LJU-2022				
628	9	Fit a straight line to the following data: x: 71, 68, 73, 69, 67, 65, 66, 67 y: 69, 72, 70, 70, 68, 67, 68, 64		3					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
629	9	Fit a straight line to the following data taking x as the dependent variable. x: 1 3 4 6 8 9 11 14 y: 1 2 4 4 5 7 8 9		3					
630	9	Fit a straight line to the following data. Using a equation find the value of y when $x = 2.4$ x: 1 2 3 4 5 6 7 y: 0.5 2.5 2.0 4.0 3.5 6.0 5.5		3					
631	9	Fit a straight line to the data given below. Also estimate the value of y at $x = 2.5$ X: 0 1 2 3 4 Y: 1 1.8 3.3 4.5 6.3		3					
632	9	Using method of least squares, Find the best fitting second-degree curve to the following data: x: 1 2 3 4 y: 6 11 18 27		4					
633	9	Fit a parabola to the following data: x: -2 -1 0 1 2 y: 1.0 1.8 1.3 2.5 6.3		4					
634	9	Fit a second-degree polynomial using the least square method to the following data: x: 0 1 2 3 4 y: 1 1.8 1.3 2.5 6.3		4					
635	9	Fit straight line into following data: x: 0 1 2 3 4 5 y: 3 6 8 11 13 14		4					
636	9	Fit the second-degree parabola $y = a + bx^2$ to the following data: x: 1 2 3 4 5 y: 1.8 5.1 8.9 14.1 19.8		4					
637	9	Fit a parabola $y = a + bx + cx^2$ to the following data: x: 1 2 3 5 6 y: 1.1 5.8 17.5 55.9 86.7		4					
638	9	Fit a second-degree polynomial using the least square method to the following data: x: 1 2 3 4 y: 1.7 1.8 2.3 3.2		4					
639	9	Fit a second-degree parabola to the data X: 1929 1930 1931 1932 1933 1934 1935 Y: 352 356 357 358 360 361 361		4					

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Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
640	9	Fit a curve $y = ax + bx^2$ to the following data: x: 1, 2, 3, 4, 5, 6 y: 2.51, 5.82, 9.93, 14.84, 20.55, 27.06		3					
641	9	Fit a curve $y = ax + bx^2$ to the following data: x: -2, -1, 0, 1, 2 y: -72, -46, -12, 35, 93		3					
642	9	Fit a parabola $y = a + bx + cx^2$ to the following data: x: 0, 2, 5, 10 y: 4, 7, 6.4, -6		4					
643	9	Fit a curve $y = a_0 + a_1x + a_2x^2$ for the given data: x: 3, 5, 7, 9, 11, 13 y: 2, 3, 4, 6, 5, 8		4					
644	9	Find the least square polynomial approximation of degree two to the data. x: 0, 1, 2, 3, 4 y: -4, -1, 4, 11, 20		4	LJU-2022				
645	9	Fit a second-degree parabola to the following data: x: 1, 2, 3, 4, 5 y: 10, 12, 13, 16, 19		4					
646	9	Fit a second-degree parabola to the following data taking x as the independent variable. x: 1, 2, 3, 4, 5, 6, 7, 8, 9 y: 2, 6, 7, 8, 10, 11, 11, 10, 9		4					
647	9	By the method of least squares, fit a parabola to the following data: x: 1, 2, 3, 4, 5 y: 5, 12, 26, 60, 97		4					
648	9	Fit a second-degree parabola $y = a_0 + a_1x + a_2x^2$ for the given data: x: 1, 1.5, 2, 2.5, 3, 3.5, 4 y: 1.2, 1.4, 1.9, 2.4, 2.8, 3.3, 4.2		4					
649	9	Fit a straight line to the following data. x: 1, 2, 3, 4, 6, 8 y: 2.4, 3, 3.6, 4, 5, 6		3					
650	9	Fit a straight line to the following data: X: 103, 186, 99, 100 Y: 168, 120, 72, 63		3	LJU-2023				
651	9	Fit a quadratic curve to the following data: x: 2, 4, 6, 8, 10 y: 0.1825, 0.2019, 0.2621, 0.3721, 0.5123		4	LJU-2023				

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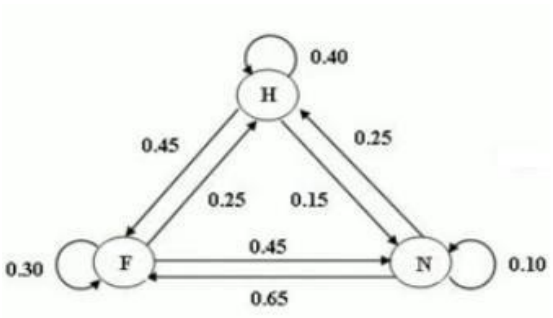
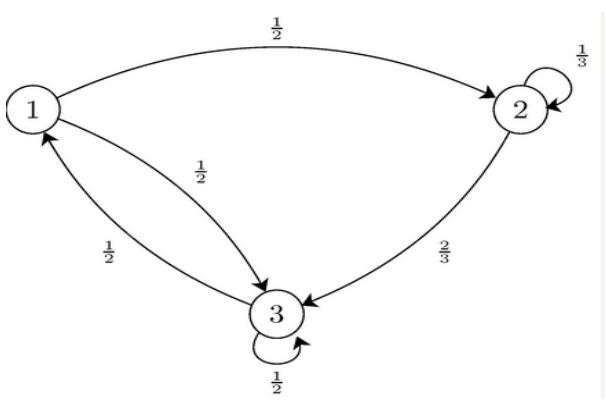
Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
652	10	If πp = π, where $P = \begin{bmatrix} 0 & 1 \\ 1/2 & 1/2 \end{bmatrix}$ then values of (π_1, π_2) is	$\left(\frac{1}{3}, \frac{2}{3}\right)$	1	LJU-2022 LJU-2023	$\left(\frac{1}{3}, \frac{2}{3}\right)$	$\left(\frac{1}{2}, \frac{1}{2}\right)$	$\left(\frac{2}{3}, \frac{1}{3}\right)$	(0, 1)
653	10	Let π = $[\pi_1, \pi_2]$ and πp = π, where $P = \begin{bmatrix} 0.9 & 0.1 \\ 0.2 & 0.8 \end{bmatrix}$ then values of (π_1, π_2) is	$\left(\frac{2}{3}, \frac{1}{3}\right)$	1		$\left(\frac{1}{3}, \frac{2}{3}\right)$	$\left(\frac{1}{2}, \frac{1}{2}\right)$	(0,1)	$\left(\frac{2}{3}, \frac{1}{3}\right)$
654	10	Consider the following transition probability matrix $P = \begin{bmatrix} 0.1 & 0.5 & 0.4 \\ 0.6 & 0.2 & 0.2 \\ 0.3 & 0.4 & 0.3 \end{bmatrix}$ and the initial probability is (0.7, 0.2, 0.1) then the value of $q_2(3)$ is	0.279	1		0.279	0.336	0.34	0.385
655	10	If the TPM of a Markov chain is $= \begin{bmatrix} 0.1 & 0.5 & 0.4 \\ 0.6 & 0.2 & 0.2 \\ 0.3 & 0.4 & 0.3 \end{bmatrix}$ find $P[X_1 = 3 / X_0 = 2]$		1					
656	10	Consider the Markov chain with three states $S = \{1,2,3\}$, that has the following transition matrix $P = \begin{pmatrix} 1/2 & 1/4 & 1/4 \\ 1/3 & 0 & 2/3 \\ 1/2 & 1/2 & 0 \end{pmatrix}$ If we know $P(X_1 = 1) = P(X_1 = 2) = \frac{1}{4}$ find $P\ (X_1 = 3, X_2 = 2, X_3 = 1)$.		3					
657	10	Three boys A, B and C are throwing a ball to each other. A always throws the ball to B and B always throws the ball to C, but C is just as likely to throw the ball to B as to A. If the initial probability distribution of three states A, B and C is 0.3, 0.4 and 0.3 respectively. Find (1) the transition matrix (2) $P(X_2 = B)$ (3) The distribution of the balls after two rounds.		3					
658	10	In the Dark Ages, Harvard, Dartmouth, and Yale admitted only male students. Assume that, at that time, 80 percent of the sons of Harvard men went to Harvard and the rest went to Yale, 40 percent of the sons of Yale men went to Yale, and the rest split evenly between Harvard and Dartmouth; and of the sons of Dartmouth men, 70 percent went to Dartmouth, 20 percent to Harvard, and 10 percent to Yale. (a) Construct the TPM. (b) Find the probability that the grandson of a man from Harvard went to Harvard (c) Find the probability that the great - grandson of a man from Harvard went to Harvard.		3	LJU-2022				
659	10	In a certain market, there are three brands of cosmetic A, B and C. Given that a lady last purchased cosmetic of brand A, there is 70% chance that she would continue with brand A, 20% and 10% chances that she would shift to brands B and C, respectively. Given that a lady last purchased cosmetic of brand B, there is 50% chances that she would shift to brand A and 10% chance to brand C. Given that a lady last purchased cosmetic of brand C, there is 60%, 20% chance that she would shift to brands A and B respectively. The present market shares of the three brands A, B and C is 60%, 30% and 10% respectively. Using this information, find a. TPM b. The probability that a customer who is currently a purchaser of brand A will purchase brand B after two time periods. c. The probability that a customer who is currently a purchaser of brand A will purchase brand C after		4					

Sr. No.	unit_ number	Question text	Answer	Marks	Previous Year	Option 1	Option 2	Option 3	Option 4
		two time periods. d. The probability that brand C will be able to retain its customer after two time periods? e. The probability that a purchaser of brand B will purchase brand A three time periods from now.							
660	10	 A professor of Statistics not wanting to be predictable decides on an innovative way of assigning homework based on probabilities. On the first day of the week, he draws a transition diagram as shown in Figure. The nodes of the diagram represent full credit (F), half credit (H) and no credit (N)assignments. The transition probabilities for day 1 are as shown in the figure. Construct TPM and compute: 1. $P(X_3 = F/X_2 = N)$ 2. $P(X_2 = N/X_1 = H)$ 3. $P(X_4 = H/X_2 = F)$		3					
661	10	The TPM of the Markov chain with three states $1, 2, 3$ is $P = \begin{bmatrix} 0.2 & 0.3 & - \\ - & 0.6 & 0.3 \\ 0.4 & - & 0.3 \end{bmatrix}$ And the initial probability is $(0.5, 0.3, 0.2)$. Complete the TPM and calculate (1) $P(X_3 = 3,\ X_2 = 2,\ X_1 = 1,\ X_0 = 3)$ (2) $P(X_3 = 3,\ X_1 = 1,\ X_0 = 3)$		3	LJU-2023				
662	10	Consider a continuous-time Markov chain $X(t)$ with the jump chain shown in Figure. Assume $\lambda_1 = 2$, $\lambda_2 = 3$, and $\lambda_3 = 4$.  (a) Find the stationary distribution of the jump chain $\bar{\pi} = \bar{\pi}_1, \bar{\pi}_2, \bar{\pi}_3$ (b) Using $\bar{\pi}$, find the stationary distribution for $X(t)$.		4	LJU-2022				
663	10	Given that a person last cola purchase was COKE, there is a 90% chance that his next cola purchase will also be COKE. If a person last cola purchase was PEPSI, there is a 80% chance that his next cola purchase will also be PEPSI. The present market share of the COKE and PEPSI is 55% and 45% respectively. Construct the TPM. In the long run, what is the market share of such cola?		3					
664	10	In a certain market, there are three brands of cosmetics A, B and C. Given that a lady last		4	LJU-2023				

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Sr. No.	**unit_ number**	**Question text**	**Answer**	**Marks**	**Previous Year**	**Option 1**	**Option 2**	**Option 3**	**Option 4**
		purchased cosmetics of brand A, there is 70% chance that she would continue with brand A, 20% and 10% chances that she would shift to brands B and C, respectively. Given that a lady last purchased cosmetics of brand B, there is 50% chances that she would shift to brand A and 10% chance to brand C. Given that a lady last purchased cosmetics of brand C, there is 60%, 20% chance that she would shift to brands A and B respectively. The present market share of the three brands A, B and C is 60%, 30% and 10% respectively. Using this information, find the market share of the brands A, B and C in the steady-state.							
665	10	Minimize $f(x_1, x_2) = x_1 - x_2 + 2{x_1}^2 + 2x_1x_2 + {x_2}^2$ starting from the point $X_1 = (0,0)$ using Gradient Decent method.		4					