II Year B. Tech – I Semester – 2023-2024

Course: Probability and Statistics **Code**:MR22–1BS0108

Question bank for minor-II examination

1. The gain in weight of two random samples of patients fed on two different Diets: A and B are given below. Examine whether the difference in mean increase in weight is significant?

Diet-A	13	14	10	11	2	16	10	8	
Diet-B	7	10	12	8	10	11	9	10	11

2. To determine whether there really is a relationship between an employee's performances in the company's training program and his or her ultimate success in the job, the company takes a sample of 400 cases from its very extensive files and obtained the results shown in the following table:

		Performance in Training Program		
		Below Average	Average	Above Average
Success in Job (Employers Rating)	Poor	23	60	29
	Average	28	79	60
	Very Good	9	49	63

3. Calculate the correlation coefficient between X and Y from the following data:

X	1	3	4	5	7	8	10
Y	2	6	8	10	14	16	20

4. Given the following Aptitude and I.Q. Scores for a group of students. Compute the rank correlation coefficient between them.

Aptitude Score	57	58	59	59	60	61	60	64
I.Q Score	95	108	95	106	120	126	106	110

5. For the following bivariate data obtain the two lines of regression. Determine the value of Y when X=3.5

X	1	2	3	4	5	6
Y	14	33	40	63	76	85

6. Fit a Second-degree parabola of the form: $Y = a + bX + cX^2$ for the following data and use to determine the value of Y corresponding to the value of X=6.2 and the value of X when Y=14.5

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

7. New Delhi Railway Station has a single ticket counter. During the rush hours, customers arrive at the rate of 10 per hour. The average number of customers that can be served is 12

per hour. Find out the following: (i) Probability that the ticket counter is free. (ii) Average number of customers in the queue.

8. Consider a single server queuing system with Poisson input, exponential service times. Suppose the mean arrival rate is 3 calling units per hour, the expected service time is 0.25 hour and the maximum permissible calling units in the system is two. Derive the steady-state probability distribution of the number of calling units in the system, and then calculate the expected number in the system.