R18

ANURAG Engineering College
(An Autonomous Institution)
II B.Tech I Semester Supplementary Examinations, June/July-2024
PROBABILITY AND STATISTICS
(COMMON TO CIVIL & CSE)

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (25 Marks)
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	A fair coin is tossed four times then find the probability of getting two heads.	CO1	L1	2M
2.	Define Probability Mass & Density functions.	CO1	L2	3M
3.	Determine the binomial distribution for which the mean is 6 and variance 5.	CO2	L1	2M
4.	Discuss any 3 characteristics of Normal Distribution curve.	CO2	L2	3M
5.	What are the normal equations to fit a straight line.	CO3	L1	2M
6.	Find coefficient of correlation for the regression lines $7x - 16y + 9 = 0$, $5y - 4x - 3 = 0$	CO3	L2	3M
7.	Define Type - I and Type - II errors.	CO4	L1	2M
8.	What is the confidence interval formula of population mean.	CO4	L2	3M
9.	What is the formula for test of significance for single mean and degrees of freedom.	CO5	L1	2M
10.	Write any 3 characteristics of F-distribution.	CO5	L2	3M

Section B (Essay Questions)
Answer all questions, each question carries equal marks. (5 X 10M = 50M)

11. A)	Write the statement of Baye's theorem. The chances of X,Y,Z becoming managers of a company are 5:2:3. The probabilities that bonus scheme will be introduced if X,Y,Z become managers are 0.3, 0.5, 0.8 respectively.	CO1	L3	10M

(i) Find the probability of bonus scheme introduced.

(ii) If the bonus scheme has been introduced, what is the probability that X appointed as manager.

OR

B) A random variable X has the following probability function : CO1 L3 10M

X	0	1	2	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Determine (i) K (ii) $P(X\geq6)$, $P(0<X<5)$ and $P(0<X<4)$ (iii) Mean & Variance.

12. A) Four coins are tossed 160 times. The number of times x heads occur is given below. CO2 L3 10M

X	0	1	2	3	4
Frequency	8	34	9	43	6

Fit a binomial distribution.

OR

B) In a normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution. | CO2 | L3 | 10M

13. A) 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) atleast one boy? Assume equal probabilities for boys & girls. | CO3 | L3 | 10M

OR

B) Find the rank correlation coefficient for the marks obtained in mathematics and English by 10 students. | CO3 | L3 | 10M

Scores in Mathematics	68	64	75	50	64	80	75	40	55	64
Scores in English	62	58	68	45	81	60	68	48	50	70

14. A) A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there 150 students having mean IQ of 75 with a S.D. of 15 in the second group there are 250 students having mean IQ of 70 with S.D. of 20. | CO4 | L3 | 10M

OR

B) 20 People were attacked by a disease and only 18 survived. Will you reject the hypothesis that the survival rate if attacked by this disease is 85% in favour of the hypothesis that is more at 1% level of significance? | CO4 | L3 | 10M

15. A) To examine the hypothesis that the husbands are more intelligent than the wives, an investigator took a sample of 10 couples and administered them a test which measures the I.Q. The results are as follows : | CO5 | L3 | 10M

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 a reasonable test at the level of significance 5% .

OR

B) The following table gives the classification of 100 works according to gender and nature of work. Test whether the nature of work is independent of the gender of the worker. | CO5 | L3 | 10M

	Stable	Unstable	Total
Males	40	20	60
Females	10	30	40
	50	50	100