K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-IISummer2025	
Exam Seat No.:	
Academic Year:2024-2025	Semester:IV
Class:SY	Program:B.Tech
Branch Code:ADS/COM/CSD/INT	Pattern:2023
Name of Course:Probability & Statistics	Course Code:2300211A
Max. Marks:30	Duration:1.15 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. Use of non programmable scientific calculator is allowed.

Marks CO

Question No. 1

1 a) Find the missing frequency for the following frequency distribution whose mean is 26. (3) CO1

Class Interval	0-10	10-20	20-30	30-40	40-50	Total
Frequency	8	?	33	?	10	90

1 b) Age distribution of hundred life insurance policy holders is as follows. Find median and mode. (4) CO2

Age	17-19	20-22	23-25	26-28	29-31	32-34	35-37	38-40
Number of policy holders	9	16	12	26	14	12	6	5

Question No. 2

2 a) Two cricketers scored the following runs in 8 innings. Find who is better run getter and who is more consistent player. (4) CO4

A	56	48	50	65	77	82	32	54
B	48	30	12	92	24	45	75	90

2 b) If the four moments of a distribution about 5 are equal to -4, 22, -117 and 560. Determine the moments about mean, coefficient of skewness and kurtosis. Also comment upon the nature of distribution (4) CO1

Group OR

2 c) Find the mean, variance and standard deviation of the following frequency distribution: (4) CO4

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of Students	5	12	15	20	10	4	2

2 d) Calculate the first four moments about mean for the following frequency distribution: (4) CO1

X	1	2	3	4	5	6	7
f	1	6	13	25	13	6	1

Question No. 3

3 a) If three coins are tossed simultaneously and if X denotes the number of heads. Find the probability distribution of X. (3) CO1

3 b) Let X be the random variable which has the following p.d.f. (4) CO3

$$f(x) = \frac{k}{1+x^2} \; ; \; -\infty < x < \infty$$

Find

i. Value of k
ii. $P(\frac{1}{\sqrt{3}} \leq X \leq \sqrt{3})$

Question No. 4

4 a) The p.m.f. of a random variable is given as follows: (4) CO3

X	0	1	2	3	4	5	6	7
P(X=x)	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

Find the value of k. Also find its expected value and variance.

4 b) The p.d.f. of a continuous random variable X is (4) CO3

$$f(x) = \begin{cases} kx^2(1-x) & ; 0 < x < 1 \\ 0 & ; Otherwise \end{cases}$$

Find the value of k and also find its mean and variance.

Group OR

4 c) Let a random variable X takes values -3,-2, -1, 0, 1, 2, 3 such that (4) CO3
$P(X = -3) = P(X = -2) = P(X = -1) = P(X = 1) = P(X = 2) = P(X = 3)$ and
$P(X < 0) = P(X = 0) = P(X > 0)$. Determine the p.m.f. of X and Also find its mean and variance.

4 d) Let X be a continuous random variable with probability density function given by: (4) CO3

$$f(x) = \begin{cases} kx & ; 0 \leq x < 2 \\ 2k & ; 2 \leq x < 4 \\ -kx + 6k & ; 4 \leq x < 6 \\ 0 & ; Otherwise \end{cases}$$

Determine the value of k and also find its expected value and variance.

····· **End of question paper**·····