



**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:III
Class:PG-II	Program:MCA
Branch Code:M.C.A.	Pattern:2022
Name of Course:Data Science	Course Code:MCA223001
Max. Marks:60	Duration:2.30 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 page(s).
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. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

**Marks CO**

**Question No. 1**

- 1a) A die is rolled once. Find the probability that it shows an even number, given that the number shown is greater than 3. (6) CO2

**Question No. 2**

- 2a) The marks scored by 6 students are: 10, 15, 20, 25, 30, 35. Compute the variance, standard deviation, and range. (6) CO5

**Question No. 3**

- 3a) Differentiate between discrete and continuous random variables with an example. (8) CO1

**OR**

- 3b) Explain the purpose of a distribution function in probability theory. (8) CO1

- 3c) Following is the p.m.f of a discrete random variable X. (8) CO1

X	0	1	2	3	4
P(X = x)	k	2k	3k	2k	k

Find (i) the value of k, (ii)  $P(X < 2)$ .

**OR**

- 3d) A shipment of 8 microcomputers contains 3 defectives. If 2 are purchased at random, find the probability distribution for the number of defectives and obtain the cumulative distribution. (8) CO1

**Question No. 4**

- 4a) A fair coin is tossed 10 times. Find the probability of getting (i) exactly 6 heads (ii) at least 6 heads. (8) CO3

**OR**

4b) Find the probability of getting at least 5 heads on tossing an unbiased coin 6 times using the binomial distribution. (8) CO3

4c) The speeds of cars are normally distributed with mean = 90 km/hr and SD = 10 km/hr. Find the probability that a car selected at random is moving at more than 100 km/hr. (8) CO3

**OR**

4d) The number of emergency admissions per day follows a Poisson distribution with mean 4. Find the probability that there will be no emergency admission. (8) CO3

**Question No. 5**

5a) Two variables X and Y have the following data: (8) CO4  
X = 2, 4, 6, 8      Y = 1, 3, 5, 7  
Calculate the covariance between X and Y and interpret the result.

**OR**

5b) Calculate Karl Pearson's coefficient of correlation for (8) CO4  
X = 10, 20, 30, 40, 50    and    Y = 15, 25, 35, 45, 55.

5c) The ranks of 8 employees in two performance tests are: (8) CO4  
X = 1, 2, 3, 4, 5, 6, 7, 8      Y = 2, 1, 4, 3, 5, 7, 6, 8  
Calculate Spearman's rank correlation coefficient.

**OR**

5d) Given X = 2, 3, 5, 7, 9    and    Y = 4, 5, 7, 10, 15 (8) CO4  
Find the regression equation of Y on X using the Least Squares Method and estimate Y when X = 8.

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