

Name:			
Enrolment No:			
UPES End Semester Examination, December 2025 Course: Applied Statistics and Probability Program: BCA Course Code: MATH2058 Calculator allowed: Yes Instructions: Semester: III Time: 03 hrs. Max. Marks: 100			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Explain the concepts of covariance and correlation in your own words. How are they similar, and how do they differ in interpreting the relationship between two variables?	4	CO1
Q2	Explain role of statistics in Data Science and Machine Learning with suitable examples.	4	CO1
Q3	In your own words, explain what skewness means in a distribution. How can you identify whether a distribution is positively or negatively skewed?	4	CO1
Q4	The marks obtained by 6 students in a class test are: 112, 105, 198, 100, 200, 204 Calculate the mean and standard deviation of these marks. Show all steps.	4	CO2
Q5	The household income of six families are given below: 10200, 15000, 10800, 20000, 25000, 18000 Calculate the mean deviation about mean of above data points.	4	CO2
SECTION B (4Qx10M= 40 Marks)			
Q5	Score of two golfers for 10 rounds were as follows: Golfer A: 74, 98, 75, 52, 77, 79, 81, 76, 77, 60 Golfer B: 86, 64, 81, 72, 84, 95, 89, 68, 90, 83 Find which golfer may be considered to be more consistent player?	10	CO2
Q6	Two stores recorded the daily sales (in thousands of rupees) over 7 days: • Store A: 12, 15, 17, 13, 14, 16, 18 • Store B: 10, 22, 8, 25, 7, 23, 9 (a) Compute the mean and standard deviation for both stores. (b) Based on the results, analyze which store shows greater consistency in sales and justify your answer.	10	CO3

Q7	A speaks truth 4 out of 5 times. A die is tossed. Her reports that there is a six. What is the chance that actually there was six?	10	CO3
Q8	A continuous random variable X has the following probability density function (pdf): $f(x) = 2x^2$, $0 \leq x \leq 3$ Using pdf, compute mean $E(x)$, Variance $V(x)$, and standard deviation. OR A continuous random variable X has the following probability density function (pdf): $f(x) = x^2 - 2x + 1$, $1 \leq x \leq 2$ Using pdf, compute mean $E(x)$, Variance $V(x)$, and mode.	10	CO4
SECTION-C (2Qx20M=40 Marks)			
Q9	Let the joint probability density function (pdf) of continuous random variables X and Y be: $f_{X,Y}(x,y) = 8xy, 0 \leq x \leq 2, 1 \leq y \leq 3$ (a) Find the marginal pdf $f_X(x)$ and $f_Y(y)$. (b) Compute the variance of $\text{Var}(X)$ and $\text{Var}(Y)$. (c) Find the covariance between X and Y, i.e., $\text{Cov}(X,Y)$. (d) Compute the Pearson correlation coefficient between X and Y.	20	CO4
Q10	A continuous random variable X has the following probability density function (pdf): $f(x) = 8x$, $1 \leq x \leq 4$ Compute the first four moments of the distribution about origin of the variable X. Obtain $\beta_1, \gamma_1, \beta_2, \gamma_2$. OR A continuous random variable X has the following probability density function (pdf): $f(x) = 4x^2 + 1$, $0 \leq x \leq 2$ Compute the first four moments of the distribution about origin of the variable X. Obtain $\beta_1, \gamma_1, \beta_2, \gamma_2$.	20	CO4