Graphic Era
HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Uttarakhand Pradesh Gazette 12 of 2011)
University under section 2(f) of UGC Act 1956

Term Evaluation (Odd) Semester Examination November 2025

Roll no.....

Name of the Course: MCA
Semester: 1st
Name of the Paper: Probability and Statistics
Paper Code: TMC 111
Time: 1.5 hour **Maximum Marks: 50**

Note:
(i) Answer all the questions by choosing any one of the sub-questions.
(ii) Each question carries 10 marks.

Q1 (10 Marks) CO1

a. What is data cleaning? Why is it important?

OR

b. Two coins are tossed together. Find the probability of getting
(i) two heads
(ii) one head
(iii) no head

Q2. (10 Marks) CO1

a. Define the following.
(i) Sample space
(ii) Independent events
(iii) Variance
(iv) Expectation

OR

b. Define Binomial distribution with its probability density function. If a fair coin is tossed 8 times, find the mean and variance of the number of heads obtained.

Q3. (10 Marks) CO1 & CO2

a. A random variable has following PMF

X	0	1	2	3
P(X)	0.1	0.3	0.4	0.2

Find first four moments.

OR

b. Define mathematical expectation. Derive and prove the following two properties in case of discrete random variable
(i) $E(X+Y)=E(X)+E(Y)$
(ii) If X and Y are independent, then $E(XY)=E(X)E(Y)$.

Q4. (10 Marks) CO2

a. Define normal distribution with its probability density function. For a normal distribution with mean $\mu=100$ and standard deviation 10, find the probability that a value lies between 90 and 110.
($Z=-1.00 \Rightarrow P(Z)=0.1587$, $Z=1 \Rightarrow P(Z)=0.8413$).

OR

b. A random variable X takes the values 1, 2, 3 with probabilities k, 2k and 1-3k respectively. Find
(i) the value of k,
(ii) the mean and variance of X.

Q5. (10 Marks) CO2

a. Define outlier and find the outlier for the following data set of test scores of 10 students.
Scores = {75, 80, 82, 85, 78, 125, 83, 79, 81, 77}

OR

b. Let the random variable X has the distribution:
P(X=0) = P(X=2) = p; P(X = 1) = 1-2p for $0 \leq p \leq \frac{1}{2}$
For what values of p is the Var (X) a maximum.