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

Mid Term (Odd) Semester Examination October 2024

Roll no.....

Name of the Course and semester: MCA I semester
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)

a. What is statistics? Discuss its scope, application and limitations. CO1

OR

b. Explain the need and usefulness of diagrammatic representation of statistical data. What are the different types of diagrams you know? CO1

Q2. (10 Marks)

a. Calculate the missing frequency from the following distribution, it being given that the median of distribution is 24. CO1

Age in years	0-10	10-20	20-30	30-40	40-50
No. of persons	5	25	f_1	18	7

OR

b. Consider a small unit of a factory where there are 5 employees: a supervisor and four labourers. The workers earn a salary of Rs. 5,000 per month each while the supervisor gets Rs. 15,000 per month. Calculate the mean, median and mode of the salaries. CO1

Q3. (10 Marks)

a. It is observed that 50% of mails are spam. There is a software that filters spam mail before reaching the inbox. It accuracy for detecting a spam mail is 99% and chances of tagging a non-spam mail as spam mail is 5%. If a certain mail is tagged as spam find the probability that it is not a spam mail. CO2

OR

b. A bag I contains 4 white and 6 black balls while another Bag II contains 4 white and 3 black balls. One ball is drawn at random from one of the bags, and it is found to be black. Find the probability that it was drawn from Bag I. CO2

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Q4. (10 Marks)

a. Find the binomial distribution of getting a six in three tosses of an unbiased dice. CO2

OR

b. A random variable X has the following probability function values

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

(i) Find the value of b
(ii) Determine the distribution function of random variable X C02
(iii) Evaluate $P(X < 6), P(X \geq 6), P(0 < X < 5)$

Q5. (10 Marks)

a. Experience shows that a box of 400 component of a company has 1% of defective items. Find the probability that such a box has
(i) No defective items CO2
(ii) One component is defective
(iii) At most 3 components are defective, given that $e^{-4} = 0.0183$

OR

b. There are four fused bulbs with a lot of 10 good bulbs. If three bulbs are drawn at random with replacement, find the probability of distribution of the number of fused bulbs drawn. CO2