SET-2

INDIRA UNIVERSITY, PUNE

SCHOOL OF INFORMATION TECHNOLOGY-BCA

Term End Examination (2025 Pattern) December – 2025 - Semester – I

Subject Name: - Discrete Mathematics and Statistics **Max. Marks: 25**
Subject Code: 25BCA109T **Time: 1:30 Hrs.**

Instructions

- All Questions are Compulsory.

CO #	Cognitive Ability	Course Outcome
CO1	**Remember**	Recall fundamental concepts of discrete mathematics and statistics, such as set theory, logic, probability, and data types.
CO3	**Apply**	Apply discrete mathematics techniques, such as counting methods, relations, and graph algorithms, to solve problems in computer science and data analysis.
CO5	**Evaluate**	Evaluate the correctness of logical arguments, solve optimization problems, and assess statistical models for their accuracy and reliability.

Q1.	**Attempt any 5 out of 7. (1 mark each) (5 Marks)** a. Define cardinality of set. b. Write Truth table for conjunction (and). c. Give one example of equivalence relation. d. If A and B are mutually exclusive, what is $P(A \cap B)$? e. Define range of a dataset. f. State addition principle of counting. **g.** Write the general form of the regression equation of Y on X.	CO1
Q2.	**Attempt any 2 out of 4. (5 marks each) (10 Marks)** a. Construct the truth table for each of the following statement patterns. ~ (~ p ∧ ~ q) ∨ q. b. In a class of 60 students, 25 play cricket, 20 play football, and 10 play both. Find the probability that a student selected at random plays cricket or football. c. Draw a histogram to represent the following frequency distribution.	CO3

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	3	8	12	14	10	6	5	2

d. Suppose the standard deviation of 50 observations is 20. Find the standard deviation if each observation is

(i) Increased by 10 (iv) Reduced to one third

(ii) Decreased by 5 (v) Doubled and then increased by 5

(iii) Doubled

Q.3. CO5

a. Let R be a relation on Z , defined by,

$xRy \; if \; and \; only \; if \; 3x + 4y \; is \; divisible \; by \; 7 \quad \forall x, y \in Z.$

Evaluate whether R is an equivalence relation on Z. **(5 Marks)**

b. Write any five properties of regression coefficients. **(5 Marks)**

OR

Using Warshall's Algorithm, obtain transitive closure of relation R, where $R = \{(1,2),(2,2),(2,4),(3,2),(3,4),(4,1)\}$ on the set $A = \{1,2,3,4\}$.

(10 Marks)

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