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 Evaluation (Odd) Semester Examination November 2025

Roll no.....

Name of the Course: BCA
Semester: I
Name of the Paper: *Mathematical Foundation of Computer Science*
Paper Code: TBC-103
Time: 1.5 hour / (90 Minutes) Maximum Marks: 50

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

Q1. **(CO 1)** (10 Marks)

a. What is a set? Define the following terms with suitable examples:
(i) Finite Set
(ii) Infinite Set
(iii) Partitions of Set
(iv) Difference of Two Set

OR

b. Find the power set for the following given set:
(i) A = {x, y}
(ii) B = Ø or { }, where Ø or { } is denote the empty set/null set.
(iii) C = {Ø, {5}}
(iv) D = {1, 2, 3}

Q2. **(CO 1)** (10 Marks)

a. Write the following set in the set builder form:
(i) A = {2, 3, 5, 7, 11, 13, 17, 19, 23}
(ii) B = {1, 4, 9, 16, 25, 36, 49, 64, 81, 100}
(iii) C = {1, 3, 5, 7, 9, 11, 13, 15, …}
(iv) D = {1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8}

OR

b. Draw the Venn Diagram of the following sets:
(i) A - (B ∪ C)
(ii) (A - B) ∩ (A - C)
(iii) A ∪ A', where A' denotes the complement of the set A.
(iv) Symmetric difference of two sets i.e., A △ B.

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Q3. **(CO 1)** (10 Marks)

a. Prove the following Demorgan's Law:
   (i) $(A \cup B)' = A' \cap B'$
   (ii) $(A \cap B)' = A' \cup B'$

where, A' and B' denotes the complement of set A and set B, respectively.

OR

b. If A and B are any two sets, then show that:
   (i) $A \cap (B - A) = \emptyset$
   (ii) $(A - B) \cap B = \emptyset$

Q4. **(CO 2)** (10 Marks)

a. Define the functions with an example. Also define the following terms:
   (i) Range and domain of a function
   (ii) One-to-One function
   (iii) Onto function
   (iv) Inverse function

OR

b. List all possible functions on $X = \{1, 2, 3\}$ to $Y = \{a, b\}$ and indicate in each case whether the function is one-to-one and onto. How many total numbers of functions are there from X to Y and Y to X?

Q5. **(CO 2)** (10 Marks)

a. What is the difference between relations and functions, give an example in support of your answer. Also define the following terms:
   (i) Reflexive Relation
   (ii) Symmetric Relation

OR

b. What is partial order relation? Give an example of a relation that is reflexive, symmetric, and transitive.