**INSTITUTE ENGINEERING AND TECHNOLOGY, GREATER NOIDA**

**Assignment # 1**

**SUBJECT: Discrete Structure BRANCH: AIML**

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|  | **Attempt all parts** | | **CO1** |
|  | **a.** | How many numbers of three digits can be formed with digits 1, 3, 5, 7 and 9? |  |
|  | **b.** | Define: (i) Singleton set (ii) Void Set |  |
|  | **c.** | Give an example of difference on Multiset. |  |
|  | **d.** | Represent 'A ⨁ B' with venn diagram. |  |
| **2.** | **Attempt all parts** | | **CO1** |
|  |  | Consider a relation P on the set N is given by “P = {(a, b) ∈ N × N: a divisor of b}”. Identify whether P is transitive or not transitive relation on set N. |  |
|  |  | What is powet set? Give example explaining cardinality of power set. |  |
| **3.** | **Answer all of the following-** | | **CO1** |
|  | **a.** | Prove: (i) A ∩ B = B ∩ A, (ii) A ∪ B = B ∪ A |  |
|  | **b.** | Prove that: A ⨁ U = Ac |  |
| **4** | **Answer any one of the following-(Any one can be applicative if applicable)** | | **CO1** |
|  | **a.** | **Question-** If A, B, and C are sets, using example show that: |A ∪ B ∪ C| = |A| + |B| + |C| − |A ∩ B| − |A ∩ C| − |B ∩ C| + |A ∩ B ∩ C|. |  |
|  | **b.** | **Question-** Let A, B, and C be sets. Show that: a) (A ∪ B) ⊆ (A ∪ B ∪ C) b) (A ∩ B ∩ C) ⊆ (A ∩ B). |  |
| **5.** | **Answer any one of the following-** | | **CO1** |
|  | **a.** | (i)Determine whether each of these functions is a bijection from R to R. a) f(x) = 2x + 1 b) f(x) = x2 + 1  (ii) Explain Mathematical induction with suitable example |  |
|  | **b.** | (i) Let A = {4, 6, 8, 10} and R = {(4, 4), (4, 10), (6, 6), (6, 8), (8, 10)} is a relation on set A. Determine transitive closure of R.  (ii) prove square root 2 is an irrational number using contradiction proof technique. |  |