ARYA College of Engineering (ACE)

Previously Known as Arya Institute of Engineering & Technology (AIET)

(Affiliated to RTU Approved by AICTE, New Delhi)

REAP Code : 1011

- Main Campus, SP-40, RIICO Industrial Area, Delhi Road Kukas, Jaipur - 302028 | Tel Ph. 0141-2820700
- www.aryacollegejpr.com
- Toll Free : 1800 102 1044

Department of Artificial Intelligence and Data Science

II Year IV Semester

4AID2-01: Discrete Mathematics Structure

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-I

Q1. Prove, for finite sets A and B: n(A B) = n(A) + n(B) – n(A B)	BLT-3	CO-1
Q2. In a class of 80 students, 60 play football and 40 play basket ball. Find how many plays both games and how many play football only play.	BLT-3	CO-1
Q3. State and prove the pigeonhole and generalized pigeonhole principle.	BLT-2	CO-1
Q4. Out of 250 failed students, 128 fails in maths, 87 in physics, and 134 in English, 31 failed in math and physics, 54 failed in English and maths, 30 failed in English and physics. Find:- (i) All three subjects. (ii) In English or in maths, but not in physics.	BLT-4	CO-1
Q5. Define polynomial, exponential and logarithmic function with example.	BLT-1	CO-1

ASSIGNMENT-II

Q1. Show that $(p \wedge q) \wedge (r \wedge s) \rightarrow p$ for any proposition is a tautology	BLT-3	CO-2
Q2. Define finite state machine.	BLT-1	CO-2
Q3. Obtain PCNF of the statement S given be$(\sim p \rightarrow r) \wedge (q \leftrightarrow p)$.	BLT-4	CO-2
Q4. Explain about predicate and quantifier.	BLT-1	CO-2
Q5. Show that $\sim(p \leftrightarrow q) \equiv \sim p \leftrightarrow q \equiv p \leftrightarrow \sim q$	BLT-2	CO-2

ASSIGNMENT-III

Q1. Determine the number of ways to place 2k+1 indistingushable balls in three distinct boxes so that any two boxes together will contain more than other one.	BLT-1	CO-3
Q2. Prove that C(2n,2) = 2C(n,2) + n^2	BLT-2	CO-3
Q3. Find the number of way in which an arrangement of 4 letter can be made from the letters of the word PROPORTION .	BLT-4	CO-3
Q4. Solve the recurrence relation a_n + 5a_(n-1) + 6a_(n-2) = 3n^2 - 2n + 1	BLT-3	CO-3
Q5. Solve the recurrence relation 3a_(n+1) = 〖2a〗_n +a_(n-1) ,n≥ 1 with a_0 =7 ,a_1 = 3	BLT-3	CO-3

Department of Artificial Intelligence and Data Science

II Year IV Semester

4AID2-01: Discrete Mathematics Structure

ASSIGNMENT-IV

Q1. Show that If f is a homomorphism of a group G into a group G' with kernel K is a normal subgroup of G.	BLT-1	CO-4
Q2. Let H be a subgroup of index 2 in a group G. Show that H is a normal subgroup of G.	BLT-3	CO-4
Q3. Let G be the set of all non-zero real numbers and let a*b = ab/2 . Then show that (G,*) is an abelian group	BLT-3	CO-4
Q4. Define the binary operations ⨁ and ʘ on Z by x⨁ y = x + y - 7 and x ʘ y = x + y -3xy ,∀ x,y ∈ Z. Is (Z, ⨁, ʘ) is a ring? if not then why ?	BLT-1	CO-4
Q5. Every field is an integral domain but the converse is not true.	BLT-4	CO-4

ASSIGNMENT-V

Q1. Prove that a simple graph with n vertices and k components can have at most ((n-k)(n-k+1))/2 edges	BLT-3	CO-5
Q2. Let G be connected planar graph with n_v vertices, n_e edges and n_(f) faces .then prove that n_v -n_e + n_(f) = 2 .	BLT-3	CO-5
Q3. Show that in a complete graph with n- vertices there are (n-1)/2 edge disjoint Hamiltonian circuits, if n is an odd number> 3.	BLT-3	CO-5
Q4. A planar graph has 30 vertices each of degree 3 . in how many regions can this graph be partitioned ?	BLT-1	CO-5
Q5. Define (i) Graph (ii) Undirected graph and directed graph (iii) Finite and infinite graph (iv) Pendent vertex **(v)** Bipartite graph	BLT-1	CO-5

*BLT: BLT shows the **Bloom's taxonomy** levels