



Student Name: _____

Roll No: _____

Program: CS-18 A&B

Semester: SPRING – 2021

Time Allowed: 20:00 minutes

Course: Artificial Intelligence (CS 401 & 461)

Examination: MOCK

Total Marks: **60** Weightage: **30**

Date: 19/05/2021

Instructor: Dr. Hafeez ur Rehman

NOTE: Attempt all questions. Distribute your time according to question's overall weightage.

Time Allowed: 20 minutes

Submissions after 20 minutes will not be accepted.

Question # 03:

[Marks: 20]

Consider the 5-Queen problem that you would like to solve using Genetic Algorithms. Each queen can only move in its column. The idea is to find a configuration in which no queen attacks the other. A random configuration of the problem is shown below:

[Marks Distribution: 4+4+8+2+2]

	Q2			
			Q4	
				Q5
Q1				
		Q3		

In the above context answer the following:

- How will you turn it into a maximization problem? Write objective function.
- What will be the maximum fitness value that your algorithm will try to achieve?
- Start with a random population of **four individuals** and list the steps involved using Genetic Algorithm (allowed modification operators are crossover and mutation) in generating the first generation of states?
- What will happen if the mutation probability is set to 0?
- What will happen if we avoid doing crossover?