



SPRING MID SEMESTER EXAMINATION-2025

School of Computer Engineering
Kalinga Institute of Industrial Technology, Deemed to be University
Artificial Intelligence
[(CS30002)]

Time: 1 1/2 Hours

Full Mark: 20

Answer Any four questions including question No.1 which is compulsory.

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.

1. Answer all the questions. [1 Mark X 5]
 - a) What are the various components in the Node of a search tree?
 - b) Provide the concept of bidirectional searching algorithm ?
 - c) Why depth first search is an incomplete algorithm ?
 - d) You are given a 2D grid with obstacles and a start and end point. Which search algorithm would you choose to find the shortest path and why?
 - e) Discuss the optimality of Greedy Best First Search.
2. Prove the following statements or give a counter example:-
 - a. Breadth-first search is a special case of uniform-cost search.
 - b. Uniform-cost search is a special case of A* search. [5 Marks]
3. Provide the steps and data structures needed for A* algorithm . Using the Algorithm , discuss how A* algorithm manages to switch paths when an optimal or more promising path is present. You have to use an example graph to explain your answer. [5 Marks]
4. You have three jugs, measuring 12 gallons, 8 gallons, and 3 gallons, and a water faucet. You can fill the jugs up or empty them out from one to another or onto the ground. You need to measure out exactly one gallon. Give the search problem formulation for above problem. [5 Marks]
5. The N-Queen problem can be solved using Genetic Algorithm and other Searching Algorithms.
 - (a) Considering the case of 4-Queen problem apply the steps of Genetic Algorithm for atleast 2 iterations.
 - (b) Explain how solving N-Queen problem using Genetic Algorithm is conceptually different from solving the same problem using other searching techniques. [5 Marks]