National Institute of Technology Hamirpur

Himachal Pradesh-177 005, India

Mid Term Examination – September 2022

Department of Computer Science and Engineering

Degree Program: B.Tech
Course Title: Artificial Intelligence
Date of Examination: 06-12-2022,
Teacher's name: Dr. D. P. Mahato
Course Code: CS-411

Class: 4th Year
Semester: 7th
Session: B
Time duration: 3 hours (02.30 PM to 05.30 PM)
Total Marks: 50

General Instructions:

1. **All the questions are compulsory.**

Q.1) (a) Explain different areas where AI has a great impact.

(b) Explain the different software platforms for AI development.

(c) What is knowledge representation in AI ? Explain the various techniques of knowledge representation in AI ?

5+5+5=15 marks

Q.2) Evil Robot has almost completed his Evil Plan for the total destruction of the human race. He has two nasty chemicals, which he has imaginatively called A and B which are currently stored in containers 1 and 2 respectively. All he has to do now is to mix them together in a container 3. His designer, an equally evil computer scientist, has equipped Evil Robot with a propositional planning system that allows him to reason about the locations of particular things and about moving a thing from one place to another.

(a) Explain how this problem might be represented within a propositional planning system. Give specific examples of the way in which the start state and goal can be represented.

(b) Describe in detail an algorithm that can be used to find a plan using this form of representation.

(c) Explain why in this particular planning problem it might be necessary to include one or more precondition axioms and give an example of such an axiom using your representation.

5+5+5=15 marks

Q.3) Maximize the function $f(x) = x^2$ with x in the interval $[0, 31]$ using Genetic Algorithm. Total Iteration Number=4.

20 marks