JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech-VIII Semester (ECE)

COURSE CODE(CREDITS): 18B1WEC838(3) MAX. MARKS: 35

COURSE NAME: ARTIFICIAL INTELLIGENCE TECHNIQUES

COURSE INSTRUCTORS: DR. NISHANT JAIN MAX. TIME: 2 Hour

Note: *(a)All questions are compulsory.*

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

Q1. What do you understand by an AI agents? Explain the following AI agents:

a. Simple Reflex Agent
b. Model-based reflex agent
c. Goal-based agents
d. Utility-based agent
e. Learning agent

[6] CO1, CO2

Q2. Explain the following algorithms with respect to searching of the path in the maze game:

a. DFS
b. BFS
c. Greedy Best First Search.
d. A* Search

[4]CO2

Q2. Explain the differences between the following with the help of an example:

a. Propositional Logic and First Order Logic (FoL).
b. Universal and Existential Quantifier.

[2 X2 = 4] CO3

Q3. Following facts are known:

i. If a perfect square is divisible by a prime P, then it is also divisible by a square of P.

ii. Every perfect square is divisible by some prime number.

iii. 36 is a perfect square.

Create a knowledge base of the above 3 facts given, and using first order logic determine if there exists a prime (q) such that the square of q divides 36.

[5] CO4

Q4. Represent the following sentences using FoL syntax:

a. Some dogs bark.
b. All barking dogs are irritating.
c. Fathers are male parents with children.

[3] CO3

Q5. Explain the following inference rules with the help of suitable examples:

a. Universal Elimination Rule.
b. Existential Elimination Rule.
c. Existential Introduction Rule.

[3] CO3

Q6. What do you understand by Unification in FoL? If knows(a,b) means 'a' knows 'b' and Mother(a) means mother of 'a' , then explain how the following pair of sentences can unified:

a. knows(John,x) , knows(John, Jane)
b. knows(John,x), knows(y, Mother(y))
c. knows(John,x), knows(x, Elizabeth)

[2+3=5] CO3

Q6. Following facts are known:

i. If a triangle is equilateral then it is isosceles.
ii. If a triangle is isosceles then 2 sides AB and AC are equal.
iii. If AB and AC are equal, then angle B and angle C are equal.
iv. ABC is an equilateral triangle.

Considering the above facts given, infer the following through Resolution in first order predicate logic:

Angle B = Angle C

[5] CO4