Tribhuvan University
Institute of Science and Technology
2080
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Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSC 261)
(Artificial Intelligence)
(NEW COURSE)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as for as practicable.
All figures in the margin indicate full marks.

Section A

Long Answer Questions
Attempt any TWO questions   [2×10=20]

1. Prepare state space graph for following puzzle problem, where only move left, move right, move up and move down actions are allowed. On the so constructed state space, label the states as A, B, C,.....Z and use the greedy best to test whether it finds the goal or not.

1	2

Initial State

	1
2	

Goal State

Assume the path cost from one step to another as 1 and heuristic function, f(n), as a number of misplaced cells.   [10]

2. Write the rules to convert statements in predicate logic into CNF form. Convert following sentences into FOPL.   [4+6]
    All students of BSC CSIT are intelligent person.
    All friends of intelligent person are smart
    Laxmi is a friend of Rojina
    Rojina is smart
    All beautiful students are girl
    Laxmi is beautiful
    Using resolution algorithm infer that "Laxmi is smart".

3. What is the role of activation function in ANN. How sigmoid function works? Discuss about perceptron learning.   [2+2+6]

Section-B

Short Answer Questions
Attempt any EIGHT questions.   [8×5=40]

4. What is Turing Test? What properties an agent should have to pass the Turing Test? [3+2]

5. What are the properties of intelligent agent? How simple reflex agents work? Give an example of simple reflex agent.   [2+2+1]

6. Why alpha beta pruning is necessary? How alpha beta pruning is done in game search, illustrate with an example. [1+4]

7. How knowledge is represented using frames? Represent following knowledge using frames.
[1+4]
Ram is name of an employee. His age is 27. He is male. He belongs to the department HR, where the number of employees is 110 and the average salary of the department is Rs.45000. All departments are under Tribhuvan University. The organization type of Tribhuvan University is Educational.

8. Define selection, crossover, and mutation operations in genetic algorithm. [5]

9. Using your own assumptions, design PEAS framework for following intelligent agents;
[2.5+2.5]
   a. Covid-19 prediction system
   b. Vaccine recommender system

10. Describe the components of expert system. [5]

11. Why pragmatic analysis is necessary in NLP? How pragmatic analysis is done? [2+3]

12. How iterative deepening search is used to find path from initial state to goal state in state space representation of any problem? Illustrate with an example. [5]