National Institute of Technology Silchar End-Semester (PG) Examinations, May 2024

| Subject Code: CS 5109 | Subject: Artificial Intelligence |
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| Semester: 2 nd Semester | Department: Computer Science & Engineering |
| Duration: Two Hours | Total Marks: 50 |

Answer any 5 (five) questions.

| | | | Marks | CO |
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| 1. | . (a) | Draw a semantic network representing the following knowledge: Every vehicle is a physical object. Every car is a vehicle. Every car has four wheels. Electrical system is a part of car. Battery is a part of electrical system. Pollution system is a part of every vehicle. Vehicle is used in transportation. BMW is a car. | 3 | CO-2 |
| | (b) | How AO* algorithm is used for problem reduction? Explain with suitable example. | 3 | CO-3 |
| | (c) | Explain various approaches and properties of knowledge representation. | 4 | CO-2 |
| 2. | . (a) | What are the heuristics and what is their importance? Describe their types with the help of examples. | 4 | CO-1 |
| | (b) | Justify the following statement: "Heuristics are not sure to lead to a solution yet the field of AI is full of them". | 3 | CO-3 |
| | (c) | Explain forward chaining and backward chaining concept. | 3 | CO-1 |
| 3. | . (a) | Discuss the historical evaluation of Artificial Intelligence. | 4 | CO-2 |
| | (b) | Explain Unit Resolution with example. | 3 | CO-1 |
| | (c) | Explain the following statement for resolution refutation: "If any proof satisfies the Input Resolution by default it also satisfies Linear Resolution but the reverse is not possible". | 3 | CO-3 |
| 4. | (a) | Explain different types of Transformers in AI. | 4 | CO-1 |
| | (b) | What are Quantifiers? Explain types with syntax and example | 4 | CO-1 |
| | (c) | Prove that $((p \rightarrow q) \land (r \rightarrow q)) \rightarrow (r \rightarrow p)$ is a tautology | 2 | CO-3 |
| 5. | (a) | Deduct the following statements using Propositional Logic and explain with truth table: "If Priyanka is the VP of Gymkhana, then Priyanka is well-known in NIT Silchar. Priyanka is NOT the VP of Gymkhana. Therefore, Priyanka is NOT well-known in NIT Silchar" | 4 | CO-3 |
| | (b) | Explain the concept of Constraint Satisfaction Problems (CSP). | 2 | CO-2 |
| | (c) | Write value of ABCD+EBCB=AFGAG. Constraints in this Cryptarithmetic Problem are: Each alphabet takes only one number from 0 to 9 uniquely. No two digits can be assigned to the same latter. Only the single digit number can be assigned to a letter. Sum of two single digit numbers can be maximum 19. | 4 | CO-3 |

| 6. a) |) | Consider the following statements:1. Whoever can read is literate.2. Animals are not literate.3. Some animals are intelligent. | 4 | CO-3 |
|-------|----|---|---|------|
| | | Prove the following by resolution refutation:Some who cannot read are also intelligent. | | |
|] | b) | Explain Discrete and Continuous Environment. | 4 | CO-1 |
| (| c) | How does uniform-cost search algorithm work? | 2 | CO-1 |
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