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| **DIT UNIVERSITY, DEHRADUN**   |  |  | | --- | --- | | **B. TECH (CSE/IT)** | **: END TERM EXAMINATION, ODD SEM 2023-24 (SEM V)** | | | | | | | | | | | | | |
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| **Artificial Intelligence** | | | | | | | | | | | | |

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| **Time: 3 Hours** | **Total Marks: 100** |
| **Note: All questions are compulsory. No student is allowed to leave the examination hall before the completion of the exam.**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   |  |  |  | | --- | --- | --- | | **Q.1)** | **Attempt all Parts :** | | |  | **(a)** | **Differentiate between unsupervised and supervised learning with suitable example of each.** | |  | **(b)** | **Define PEAS. Provide PEAS description for medical diagnosis system (agent).** | |  | **(c)** | **Explain logical representation and rule-based system techniques used for knowledge representation.** | |  | **(d)** | **The disease meningitis causes the patient to have a stiff neck, 65% of the time. The prior probability that a patient has meningitis is 1/40,000 and the prior probability that any patient has a stiff neck is 3%. Calculate the probability that a patient has disease meningitis with a stiff neck.** | |  |  | **[4 x 5= 20]** | |  | | | | **Q.2)** | **Attempt all Parts :** | | |  | **(a)** | **Describe population,**  c**hromosome, gene and**  a**llele in genetic algorithm with suitable figure.** | |  | **(b)** | **Differentiate between Breadth First Search and Depth first search algorithms.** | |  | **(c)** | **Show ¬(p → q) is equivalent to p ∧ ¬q.** | |  | **(d)** | **Convert the following into FOL using quantifier**  **(i) Some girls play football.**  **(ii) Not all faculties like both Teaching and Research.**  **(iii) All humans breathe.**  **(iv) Every child respects his mother.**  **(v) Only one student failed in Sanskrit.** | |  |  | **[4 x 5= 20]** | |  | | | | **Q.3)** | **Attempt any two parts :** | | |  | **(a)** | **Explain Agent, Action, Reward, Value and Policy in reference to reinforcement learning.** | |  | **(b)** | **Explain architecture of a Fuzzy Logic System with suitable diagram. Given two fuzzy sets μA(x) = {0.2, 0.5, 0.6, 0.1, 0.9} and μB(x) = {0.1, 0.5, 0.2, 0.7, 0.8}. Compute the Union, Intersection, Complement and Cartesian product.** | |  | **(c)** | **To detect burglary, Harry put a new burglar alarm at his home. The alarm is not only capable of detecting a burglary, but it can also detect mild earthquakes. Harry has two next-door neighbours, David and Sophia, who have agreed to notify Harry at work if they hear the alarm. When David hears the alarm, he always phones Harry, but sometimes he gets confused with the phone ringing and calls at that time as well. Sophia, on the other hand, enjoys listening to loud music and occasionally misses the alarm. Calculate the likelihood of a burglary alarm in this case. (Refer Figure 1)**   1. **Find the probability that the alarm has sounded and a burglary has happened but earthquake has not occurred and David has called but Sophia has not called.** 2. **Find the probability that the alarm has not sounded and a burglary has happened but earthquake has not occurred and both David and Sophia called.** | |  |  | **[2 x 10= 20]** | |  | | | | **Q.4)** | **Attempt any two parts :** | | |  | **(a)** | **Solve the following cryptarithmetic problem given in Figure 2 where each of the letters will contain unique values.** | |  | **(b)** | **Write a program in python for generating the graph shown in Figure 3.** | |  | **(c)** | **Explain Reasoning, Monotonic Reasoning​, Non-Monotonic Reasoning​, Probabilistic Reasoning and Certainty Factor.** | |  |  | **[2 x 10= 20]** | |  | | | | **Q.5)** | **Attempt any two parts :** | | |  | **(a)** | **Write a program using python to implement Depth-first Search algorithm.** | |  | **(b)** | **Explain feed forward and back forward of ANN. Compute the outputs y1, y2, y3, y4, and y5 from the network shown in Figure 4.** | |  | **(c)** | **Explain the terms Unification and Resolution. Find the MGU of**  **(i) {p(b, X, f(g(Z))) and p(Z, f(Y), f(Y))}**  **(ii)Q(a, g(x, a), f(y)), Q(a, g(f(b), a), x)}** | |  |  | **[2 x 10= 20]** | | **-----END OF PAPER ----** | | | | |

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|  | **Binary Search Trees (BST) with code in C++, Python, and Java | Algorithm  Tutor** |
| **Figure 1** | **Figure 3** |
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| **Figure 2** | **Figure 4** |