Surendranath College
M.Sc. in Computer Science
Mid-Semester Examination, 2022
Semester: III
Paper Name: Artificial Intelligence
Paper Code: CSMC304

Time: 1 hour **Full marks: 30**

(Answer any *six* questions out of eight. Each question carrying *5 marks*)

1. Consider the following two sets P and D, which represent a set of paddy plants and a set of plant diseases. More precisely P = {P1, P2, P3, P4} a set of four varieties of paddy plants D = {D1, D2, D3, D4} of the four various diseases affecting the plants In addition to these, also consider another set S = {S1, S2, S3, S4} be the common symptoms of the diseases. Let, R be a relation on P × D, representing which plant is susceptible to which diseases, then R can be stated as, R =

	D1	D2	D3	D4
P1	0.6	0.6	0.9	0.8
P2	0.1	0.2	0.9	0.8
P3	0.9	0.3	0.4	0.8
P4	0.9	0.8	0.4	0.2

Also consider T be another relation on D X S which is given by T =

	S1	S2	S3	S4
D1	0.1	0.2	0.7	0.9
D2	1.0	1.0	0.4	0.6
D3	0.0	0.0	0.5	0.9
D4	0.9	1.0	0.8	0.2

Obtain the association of plants with the different symptoms of the disease using ***max-min composition.***

2. What is defuzzification? Consider $R = \begin{bmatrix} 1.0 & 0.2 & 0.8 \\ 0.5 & 0.9 & 0.6 \\ 0.4 & 0.8 & 0.7 \end{bmatrix}$. Find out the ***λ-cut relation*** for λ= 0, 0.2, 0.9, 0.5. (1 + (1 X 4))

3. Describe "The Turing Test approach" and "The rational agent approach" briefly. (2.5 + 2.5)

4. Define the concept of "Subsumption architecture" in short. Differentiate between the working principles of a table-based agent and a goal-based agent. (3 + 2)

5. What is the state space search problem? How can the "water-jug" problem be solved using a state space search approach? Explain. (2 + 3)

6. What is uninformed search? Write an algorithm to perform general tree-search. (2 + 3)

7. Explain depth-first search algorithm with an example. State the approach that can alleviate the problem of unbounded trees in depth-first search. (3 + 2)

8. "*Iterative deepening is actually faster than breadth-first search, despite the repeated generation of states*" – Justify the statement with an example.