Exam No: _____

GANPAT UNIVERSITY
B. TECH SEM-VI (CE/IT/CE-AI)
SECOND INTERNAL EXAMINATION – APRIL-MAY 2024
2CEIT602: Artificial Intelligence

TIME: 1 Hour **TOTAL MARKS: 20**

Instructions:
1) Figures to the right indicate full marks.
2) Be precise and to the point in your answer.
3) The text just below marks indicates the Course Outcomes Numbers, (CO) followed by the bloom's taxonomy level of the question, i.e., R: Remembering, U: Understanding, A: Applying, N: Analyzing, E: Evaluating, C: Creating.

Q.1 Describe about Fuzzy logic, Crisp logic and two membership functions. **[05] 3U**

Solution:

Fuzzy Logic (1 marks)

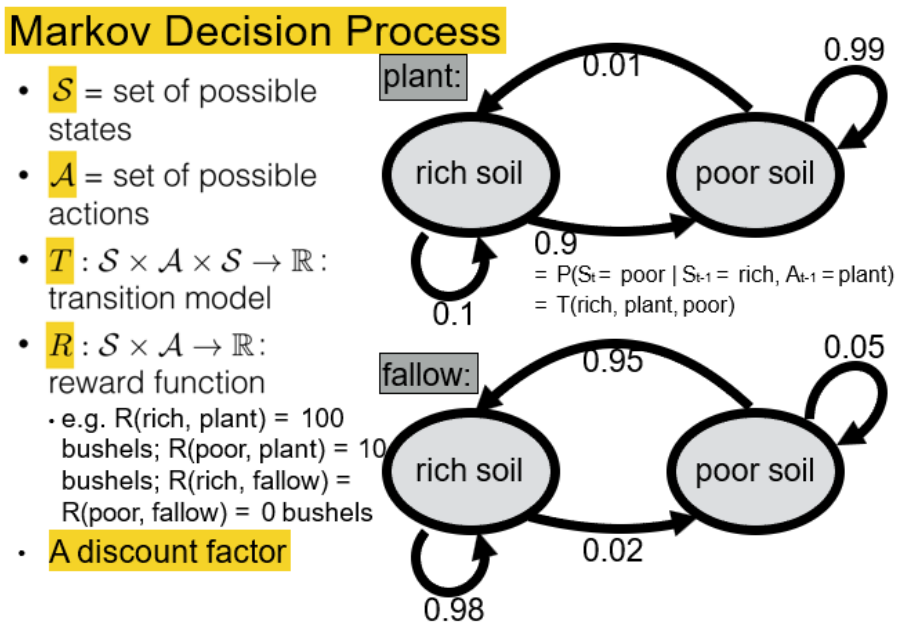
Crisp Logic (1 Marks)

2 Membership Function (2 marks)

Use of membership function (1 marks)

Q.2 Define a Markov Decision Process using the example of a farmer. **[05] 4U**

Solution:



Q.3 What weights and bias should be assigned to the inputs of a single perceptron with three inputs in order to implement the function $f(x) = 6x_1 + 21x_2 - 12x_3 + 20$, where x_1, x_2, and x_3 are the input variables, using the given activation function: if z=0 then f(z)=0, else f(z)=1? **[05] 4A**

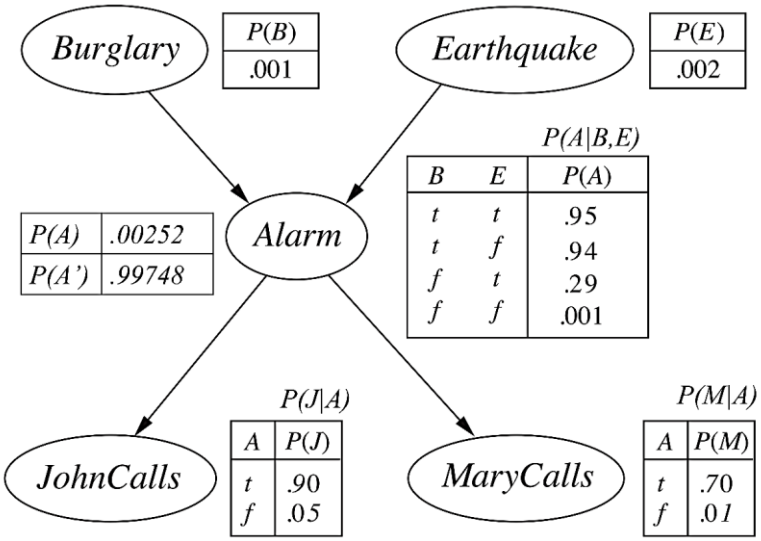
Solution:

Perceptron Equation (Marks:1)

$w_1 = 6$, $w_2 = 21$, $w_3 = -12$ (Marks:3)

bias = 20 (Marks:1)

Q.4 In the Burglary Alarm example, suppose the prior probabilities are given in the image below. What is the probability of a burglary given that John calls? In other words, what is P(Burglary|John Calls)? **[05] 3A**



Solution:

$P(B|J) = \frac{P(J,B)}{P(J)}$

$P(J) = P(J|A)P(A) + P(J|A')P(A')$

Marks:1

$P(J) = 0.90 * P(A) + 0.05 * P(A')$

$P(J) = 0.90 * 0.00252 + 0.05 * 0.99748$

$P(J) = 0.0521$

Marks:1

$P(J,B) = P(J|A)P(A|B) + P(J|A')P(A'|B)$

$P(A|B) = P(A|B,E)P(B)P(E) + P(A|B,E')P(B)P(E')$

$P(A'|B) = P(A'|B,E)P(B)P(E) + P(A'|B,E')P(B)P(E')$

$P(A|B) = 0.95 * 0.001 * 0.002 + 0.94 * 0.001 * 0.998$

$P(A|B) = 0.00094$

Marks: 1

$P(A'|B) = 0.05 * 0.001 * 0.002 + 0.06 * 0.001 * 0.998 = 0.00006$

$P(A'|B) = 0.00006$

Marks:1

$P(J,B) = 0.90 * 0.00094 + 0.05 * 0.00006 = 0.00085$

$P(B|J) = \frac{0.00085}{0.0521} = 0.0163$

Marks:1

----------END OF PAPER----------