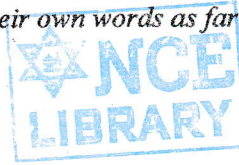


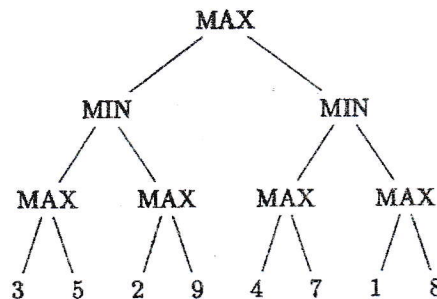
Exam.	Regular (New Course)		
Level	BE	Full Marks	60
Programme	BEI	Pass Marks	24
Year / Part	III / I	Time	3 hrs.

Subject: - Artificial Intelligence (ENCT 305)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



1. Define knowledge and learning in the context of AI. Why are they important for intelligent systems? [2+3]
2. Consider the following game tree for a two-player game. [3+3]



- a) Apply the minimax algorithm and determine the optimal value at the root. Show all intermediate values at each node.
- b) Apply alpha-beta pruning to the same tree. Indicate which branches are pruned and explain why. Show the final alpha and beta values.
3. Consider the following knowledge base. Represent them in FOPL and use Resolution refutation technique to prove "Gita likes almond": [5]
 - Gita likes almond.
 - Gita likes all kinds of food.
 - Mango and chapati are food.
 - Gita eats almond and is still alive.
 - Anything eaten by anyone and is still alive is food.
4. When do we use Fuzzy Logic? Discuss about the different components in Fuzzy Inference System. [1+4]
5. During a research work, you encounter a number of dogs that either bark or (try to) bite. The dogs are described by the binary features like Heavy, Smelly, Big and Growling. Consider the following set of examples: [8]

Heavy	Smelly	Big	Growling	Bites
No	No	No	No	No
No	No	Yes	No	No
Yes	Yes	No	Yes	No
Yes	No	No	Yes	Yes
No	Yes	Yes	No	Yes
No	No	Yes	Yes	Yes
No	No	No	Yes	Yes
Yes	Yes	No	No	Yes

Now answer following questions:

- a) What is the entropy of the target value Bites in the data?
- b) Which attribute would the ID3 algorithm choose to use for the root of the tree (without pruning)?
- c) What is the information gain of the attribute you chose in the previous question?
- d) Draw the full decision tree that would be learned for this data using ID 3 without pruning.

6/ The following table contains test results of 15 sample with real covid cases and a set of predictions from ML algorithm. [6]

S.no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Expected	+ve	+ve	-ve	+ve	-ve	-ve	-ve	+ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve
Predicted	-ve	+ve	-ve	+ve	+ve	-ve	-ve	+ve	-ve	-ve	+ve	-ve	-ve	+ve	-ve

- a) Compute the confusion matrix for the data.
 - b) Compute the accuracy, precision, recall, and F1 score.
- 7/ What do you understand by Perception? Discuss about the different activation functions along with their characteristics. Highlight the role of activation function in deep Learning. [2+3+2]
- 8/ Explain how computer vision is used in object recognition. A city has deployed a facial recognition system in public areas to enhance security, but citizens are not informed that their faces and movements are being recorded. Identify the privacy concerns raised by this system and suggest one solution to address these concerns. [3+2]
- 9/ Compare and Contrast: [2×2]
- a) Informed Vs Uninformed Search Strategies
 - b) NLU Vs NLG
- 10/ Write short notes on: [3×3]
- a) Embedded AI
 - b) Generative Neural Network
 - c) Simulated Annealing
