

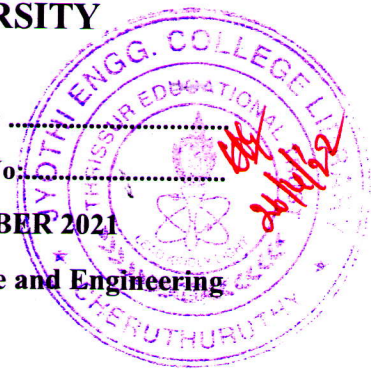
**APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER**

Q. P. Code: CS0821151A-I

(Pages: 3)

Name:

Reg. No:



FIRST SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2021

Branch: Computer Science and Engineering Specialization: Computer Science and Engineering

08CS6051(A) Computational Intelligence

Time: 3 hours

Max.marks: 60

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
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1.a	Describe the advantage of predicate logic over propositional logic. Support your answer with an example.	3
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Answer b or c

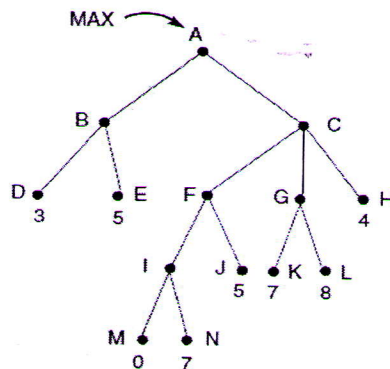
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|---|---|---|
| b | There are three missionaries and three cannibals on the left bank of a river. They wish to cross over to the right bank using a boat that can only carry two at a time. The number of cannibals on either bank must never exceed the number of missionaries on the same bank. Otherwise the missionaries will become the cannibals' dinner.
i. Specify the representation of the states, operators goal, start state and cost function.
ii. Represent the states using a graph. | 6 |
| c | Briefly explain the evaluation strategies for search mechanisms. Compare these strategies for BFS and DFS. | 6 |

Q.no.	Module 2	Marks
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2.a	Draw the semantic net for the following sentence: Layla gave Selma a book.	3
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Answer b or c

b	Consider the following figure:	6
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- | | | |
|-----|--|---|
| i. | Perform minimax on the above tree. | 6 |
| ii. | Perform a left-to-right alpha-beta prune on the above tree. | |
| c | Describe in detail about admissibility, monotonicity and informedness with the help of algorithms. | |

Q.no.

Module 3

Marks

3.a Differentiate between supervised and unsupervised learning.

3

Answer b or c

b Given the data set, build a decision tree so as to predict profit:

6

Age	Competition	Type	Profit
Old	No	Software	Down
Old	Yes	Software	Down
Old	No	Hardware	Down
Mid	Yes	Hardware	Down
Mid	No	Software	Up
Mid	No	Hardware	Up
Mid	Yes	Software	Down
Young	No	Software	Up
Young	No	Hardware	Up
Young	Yes	Software	Up

6

c Explain how the back-propagation algorithm is used for training multilayer neural networks.

Q.no.

Module 4

Marks

4.a Explain the steps involved in genetic programming.

3

Answer b or c

b Given the following parents, P1 and P2, and the template T

6

P1	A	B	C	D	E	F	G	H	I	J
P2	E	F	J	H	B	C	I	A	D	G
T	1	0	1	1	0	0	0	1	0	1

Show how the following crossover operators work

i) uniform crossover

ii) order-based crossover

with regards to genetic algorithms.

c Anyone passing his logic exams and winning the lottery is happy. But anyone who studies or is lucky can pass all his exams. John did not study but he is lucky. Anyone who is lucky wins the lottery. Is John happy?

6

Q.no.	Module 5	Marks
5.a	Write notes on part-of-speech tagging.	4

Answer b or c

b	S → NP VP	NP → Det N	8
	NP → PN	VP → V	
	VP → V NP	VP → V NP PP	
	VP → VP Adv	PP → P NP	
	Det → the a	N → waiter chairs tables hotel manager	
	PN → Oscar Paris	V → died put saw called	
	P → in on	Adv → suddenly quickly slowly	

Using the grammar rules above, draw syntax trees for:

i. Oscar died suddenly.

ii. The waiter put the chairs on the tables.

iii. Oscar called the waiter.

c	What are the characteristic of an expert system? With suitable diagram explain the structure of rule – based expert system?	8
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Q.no.	Module 6	Marks
6.a	Explain any four list manipulation functions in lisp with examples.	4

Answer b or c

b	Write lisp functions (do not use inbuilt) for the following:	8
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1) To find the length of a list.

2) To check whether an element is a member of a list.

c,	Given the facts and rules, give the program execution trace for the below given question,	8
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Facts

mother(Sita, Leva).

father(Ram, Leva).

Brother(Lakshman, Ram).

Rules:

parent(X, Y) :- mother(X, Y).

parent(X, Y) :- father(X, Y).

uncle(X, Y) :- parent(P, Y), brother(X, P).

Question:

?- uncle(X, Leva).