VIT
Vellore Institute of Technology
CHENNAI

Reg. Number | 21BCE8346

Continuous Assessment Test (CAT) – II - MAR 2024

Programme	:	B. Tech (SENSE)	Semester	:	Winter 23-24
Course Code & Course Title	:	BECE309L & Artificial Intelligence and Machine Learning	Class Number	:	CH2023240502708, CH2023240502707, CH2023240502702, CH2023240502705, CH2023240502703
Faculty	:	Dr. Vijayalakshmi A, Dr. Reena Roy R, Dr. Modigari Narendra, Dr. Kanimozhi S, Dr. Kavitha J C	Slot	:	F1+TF1
Duration	:	1 ½ Hours	Max. Mark		50

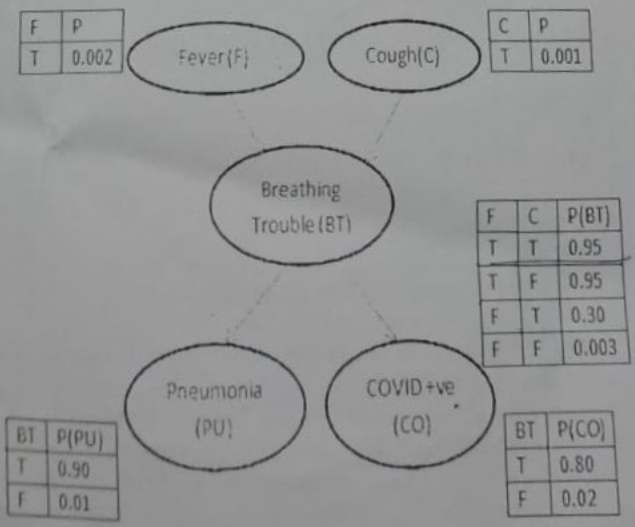
General Instructions: - Use this space to provide additional information such as graph sheet, data book, etc

- Write only your registration number on the question paper in the box provided and do not write other information.
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks
1.		a. Determine, using enumeration, whether the given expression is valid, satisfiable, or unsatisfiable. [4 Marks] $[(Food \rightarrow Party) \vee (Drinks \rightarrow Party)] \rightarrow [(Food \wedge Drinks) \rightarrow Party]$. b. Prove **P4** from the following Premises using conflict of resolution. [6 Marks] a. P1 →P2 b. ¬P2. c. ¬P1 → P3 ∨ P4. d. P3 → P5. e. P6 → ¬P5 f. P6	10
2		Convert the following sentences into propositional logic. 1. Peter is the best person in the project team even though he is not in the project anymore. [2 Marks] 2. Tom is neither a wolf nor a fox, but rather a dog. [2 Marks] 3. Tom ate the food on the floor. Mary put the food in the bowl. Peter scolds Tom if Tom ate the food on the floor and Mary put the food in the bowl. Therefore, Peter scolds Tom; however, Mary put the food in the bowl. [4 Marks] 4. If a tailor sews a shirt, then she will make money, and if a tailor sews a dress, she will not be poor. [2 Marks]	10

3.		Consider the following axioms: 1. Every person loves every snack. 2. Anyone who loves some snacks is not nutritionist. 3. Anyone who eats any apple is nutritionist. 4. Anyone who buys any apple either carves it or eats it. 5. Richard buys an apple. 6. Lifesaver is a snack. a. Convert the above statements into first order logic and clause form. [6 Marks] b. Prove that, If Richard is a person, then Richard carves some apple, using resolution with refutation. [6 Marks]	12
4.		In a clinic, the probability of the patients having viral infection is 0.15. A blood test is done on patients. If a patient has the virus, then the test is positive with probability 0.95. If the patient does not have the virus, then the test is positive with probability 0.02. Calculate the following If the test is positive what are the probabilities that the patient i) has the virus ii) does not have virus If the test is negative what are the probabilities that the patient ii) has the virus iv) does not have virus	8
5.		The Directed Acyclic Graph shows the Bayesian Belief Network with the details of random variables and its associated Conditional Probability Table (refer the Fig 1).	10



F	P
T	0.002

C	P
T	0.001

F	C	P(BT)
T	T	0.95
T	F	0.95
F	T	0.30
F	F	0.003

BT	P(PU)
T	0.90
F	0.01

BT	P(CO)
T	0.80
F	0.02

Fig 1

a. Find the probability of an individual with breathing trouble, neither fever nor cough and both pneumonia and COVID is +ve. [4 Marks]

b. Find the probability of an individual to be affected by COVID +ve. [6 Marks]

**********All the best **********