

B.E./B.TECH. Degree Examination, December 2020  
Fifth Semester  
**IT16503- Computational Intelligence**  
(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. Given the data about rainfall in Tamil Nadu, you need to predict the amount of rainfall, this is an example of -----.  
a) Supervised Learning      b) Dimensionality Reduction  
c) Unsupervised Learning      d) Serration
2. Playing online game is an example for  
a) Supervised Learning      b) Unsupervised Learning  
c) Reinforcement learning      d) None of these
3. \_\_\_\_\_ is/are the well known Expert System/s for medical diagnosis systems  
a) MYCIN      b) CADUCEUS      c) DENDRAL      d) SMH.PAL
4. The membership functions of fuzzy systems are generally represented in  
a) Tabular Form      b) Graphical Form      c) Mathematical Form      d) Logical Form
5. Write the importance of using heuristic function.
6. Differentiate alpha cutoff and beta cutoff.
7. Differentiate Propositional logic and Predicate logic.
8. Convert “All professors are people” to predicate logic.

**PART B - (4 X16 = 64 marks)**

09. (a) Consider a water jug problem with 2 jugs: a 4-gallon and a 3-gallon jug. Neither has any measuring mark in it. There is a pump that can be used to fill the jugs with water. Develop a solution that can get exactly 2-gallon of water in the 4-gallon jug. State the production rules for the water jug problem. **(16)**

**(OR)**

- (b) Formulate the following crypt arithmetic problem using constraint satisfaction strategy **(16)**

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C R O S S
+ R O A D S
.....
D A N G E R

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10. (a) Consider the following sentences **(16)**
- John likes all kinds of food.
  - Anything anyone eats and isn't killed by is food.
  - Bill eats peanuts and is still alive.
  - Sue eats everything that Bill eats.

Translate these sentences using Predicate Logic and show that “John likes peanuts” using resolution.

**(OR)**

- (b) A knowledge base has the following statements: **(16)**

R1: IF hot AND smoky THEN ADD fire

R2: IF alarm\_beeps THEN ADD smoky

R3: IF fire THEN ADD switch\_on\_sprinklers

R4: IF dry THEN ADD switch\_on\_humidifier

R5: IF sprinklers\_on THEN DELETE dry

Given the following facts

F1: alarm\_beeps

F2: hot

F3: dry

Prove that Sprinkler is on using Forward chaining and Backward chaining.

11. (a) Discuss the Apriori algorithm in detail. And use it to find all the frequent itemsets for a database with nine transactions. Assume minimum support to be 30%. **(16)**

TID	List of items
1	a,b,e
2	b,d
3	b,c
4	a,b,d
5	a,c
6	b,c
7	a,c
8	a,b,c,e
9	a,b,c

Also determine the association rules with minimum confidence 50%

**(OR)**

- (b) Explain K-means algorithm in detail. Use K-means to cluster the following 8 points **(16)**  
into 3 clusters assuming (2, 10), (2, 5) and (1, 2) as center clusters.

(2,10), (2,5),(8,4),(5,8),(7,5),(6,4),(1,2),(4,9)

12. (a) Investigate the operators of genetic algorithm and explain it with suitable examples. **(16)**

**(OR)**

- (b) Analyze how learning takes place in Multi layer Feed Forward Neural Network. **(16)**