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Code No. : 21905

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**M.Tech. (CSE: CBCS) I-Semester Main Examinations, January-2018**

**Artificial Intelligence**

Time: 3 hours

Max. Marks: 60

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

**Part-A (10 × 2 = 20 Marks)**

1. Define a Heuristic function.
2. Write the static evaluation function,  $e(p)$ , for Tic-Tac-Toe game.
3. State the resolution rule of inference. Give an example.
4. Represent the sentence "Every dog chases some cat" in predicate calculus.
5. Given  $p(P,Q) = 0.4$ ,  $p(P,\sim Q) = 0.3$ ,  $p(\sim P,Q) = 0.2$ ,  $p(\sim P,\sim Q) = 0.1$ . Compute  $p(\sim P|\sim Q)$
6. What is Sussman anomaly?
7. Define Supervised Learning.
8. What is information gain? Write its formula.
9. Define Speech act. List the categories of Speech act.
10. Compare Fuzzy set with Crisp set.

**Part-B (5 × 8 = 40 Marks)**

11. a) Describe the A\* algorithm with an example. [5]  
b) Give a solution to overcome the problem of getting stuck on local maxima in Hill-Climbing algorithm. [3]
12. a) Describe the architecture of rule based expert system. [5]  
b) Assume the following facts: [3]
  - Steve only likes easy courses.
  - Science courses are hard.
  - All the courses in the basket weaving department are easy.
  - BK301 is a basket weaving course.Show using Resolution procedure how the answer to the question 'What course would Steve like' be obtained.
13. a) Define conditional independence of random variables. Describe how Bayes Network represents conditional independence with an example. [5]  
b) Describe the frame, Ramification and Qualification problems in situation calculus. [3]
14. a) Write the Learning Algorithm for single layer feed forward neural network. [4]  
b) List the four cases which are to be considered for inducing a decision tree recursively. [4]
15. a) Explain Syntactic Analysis with an example. [4]  
b) Explain Sugeno fuzzy inference processing model with an example. [4]
16. a) Write the algorithm for Breadth-First search and list its advantages. [5]  
b) Convert the following well-formed formula into Clause form. [3]  
 $\sim (P \rightarrow Q) \vee (R \rightarrow P)$
17. Answer any *two* of the following:
  - a) Explain top-down Inference using Bayes Network with an example. [4]
  - b) Write the mathematical formula for the following activation functions used with Neural Networks: [4]
    - i) Threshold function
    - ii) Sign function
    - iii) Sigmoidal function
    - iv) Gaussian function.
  - c) Explain three types of Fuzzy membership functions with suitable diagrams. [4]

