**18CSC305J - Artificial Intelligence**

**Unit III**

**QUESTION BANK**

**PART A**

1. A Knowledge based agent ‘s environment is based on   
   a. percept b. action

c. percept and action d. action and percept.

2. The operator → in propositional logic represents

a. not b. and c. or d. if ..then

3.A sentence is true if it is true in all models is a

1. contradiction b. tautology c. unsatisfiability d. refutation

4. The existential quantification () xP(x)is read as

a. There is at least one x such that P(x) b. For all x in P(x)

c. P(x)for all values of x in domain d. P(x)for no values of x in the domain.”

5. Analogical reasoning is the process of reasoning

1. From one particular object to another b. with different assumptions c. with facts of life d. with our own ideas.

6. Forward chaining reasoning method proceeds from

1. Facts to conclusions b. Conclusion to facts

c. Facts to problems d. Conclusion to data

7.Translate the following statement into FOL.  
“Every dog is clever “

a)∀ a clever(dog) b)∃aclever(a)  
c )∀a dog(a) d) ∃adog(a)

8.Propositional logic is representation of --------------- sentence  
 a) exclamatory b) interrogative

c) declarative d) descriptive

9.A sentence is true if it is true in all models is a

a)contradiction b) tautology

c) satisfiability d) refutation

10.Basic rules applied in order to derive conclusions to get the outcome is called as

a)inference b)reference

c)logic d)semantics

11..Process of reasoning from one particular object to another is called as

a.) analogical reasoning b.) hypothetical reasoning

c.) commonsense reasoning d) crucial reasoning

12.Which is created by using single propositional symbol?

1. Complex sentence b. Atomic sentence

c. Composition sentence d. Connective sentence

13.Semantic network is

1. A way of representing knowledge b. Data type

c.  A data structure d. Association of attributes

14.Forward chaining reasoning method proceeds from

a. Facts to conclusions b. Conclusion to facts

c. Facts to problems d. Conclusion to data

15.Rule based system defines the problem domain and aims to find a solution from

a.A set of production rules       b. A set of production examples

c. A set of axioms                       d. Positive & negative examples

16.---------------- transforms system inputs, which are crisp numbers into fuzzy sets

a.Inference b. Fuzzifier

c. Defuzzifier d. Rules

17.Translate the following statement into FOL.  
“For every a, if a is a philosopher, then a is a scholar”

a. ∀ a philosopher(a) scholar(a)  b. ∃ a philosopher(a) scholar(a)

c . ∀ a philosopher(a)                  d. scholar(a)

18.Which is used to construct the complex sentences in propositional logic?  
 a. Symbols b. Connectives

c. Logics d. description

19.How many logical connectives are there in artificial intelligence?  
 a. 2 b. 3

c. 4 d. 5

20.Which algorithm will work backward from the goal to solve a problem?

a.Simulated Annealing   b. Forward chaining

c. Hill climbing          d. Backward Chaining

21.Fuzzy is of the form \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

a.Two valued logic b. Crisp Set Logic

c. Many Valued Logic d. Binary Set Logic

22.Wumpus World is a classic problem, best example of \_\_\_\_\_\_\_  
 a) Single player Game b) Two player Game  
 c) Reasoning with Knowledge d) Knowledge based Game  
23.‘α |= β ‘(to mean that the sentence α entails the sentence β) if and only if, in every model in which α is \_\_\_\_\_ β is also \_\_\_\_\_  
 a) True, true b) True, false  
 c) False, true d) False, false  
 24. Uncertainty arises in the wumpus world because the agent’s sensors give only \_\_\_\_\_\_\_\_\_\_\_  
 a) Full & Global information b) Partial & Global Information  
 c) Partial & local Information d) Full & local information

25.Logic reasoning is the process of drawing conclusions from

(A) Symbolic Rules (B) Inference Rules

(C) Logic Rules (d) resolution

**26. Suppose you are creating a bayesian network. Which of the following is the outcome between a node and its predecessors?**  
(A). Conditionally independent (B). Dependant  
(C). Functionally dependent (D). Both Conditionally dependant & Dependant

**27.Bayes rule can be used in?**  
 (A). Solving queries (B). Answering probabilistic query  
 (C). Decreasing complexity (D). Increasing complexity

**28. Which of the following is desired to build probabilistic systems feasible in the world?**  
 (A). Reliability (B). Feasibility  
 (C). Crucial robustness c) simplicity

**29. What will be returned by backward chaining AI Algorithm?**

(A). Additional statements (B). Logical statement

(C). Substitutes matching the query (d). Crucial robustness

**PART – B (4 Marks)**

1. Define logic. How Wumpus world logic is constructed for all possible models.
2. Explain the BNF representation of predicate logic.
3. Write short notes on frames.
4. Consider the following sentence for constructing CFG and a parse tree.

“Raji received a wonderful gift.”

1. List few issues associated with the representation of knowledge structure.

6.Write done the condition for entailment in logic with a suitable example.

7.How can this English sentence be translated into a logical expression? “Everyone likes someone”.

8.What is the meant by the term Inference? Explain the difference types of Inference with examples.

9.What is necessity of a Semantic Network? Explain Partitioned Semantic Network with an appropriate example.

10. *Convert the following FOPL to English*

1. ∀x IsABunny(x) ⇒IsCute(x)
2. ∀x IsAStudent(x) ∧IsTakingAI(x) ⇒IsCool(x)

11. Write short notes on frames.

12.Define tautology and entailment.

13..How can this English sentence be translated into a logical expression?

“You cannot ride the roller coaster if you are under 4 feet tall unless you are older than 16 years old.

14. .)Show that ¬(p→q) and pΛ ¬q are logically equivalent using truth table

15. Derive the conclusion using predicate logic.

1. “All lions are fierce.”
2. “Some lions do not drink coffee.”
3. “Some fierce creatures do not drink coffee .”

16. What do you mean by fuzzification?

17.Define Bayes theorem.

18. Define certainty factor.

19.What does dampster theory speicify?

20.Brief bayseian belief network.

21.Write about about Recognize-Act Cycl

22. Brief the process of matching in Production systems

23. What is conflict resolution?

24. State Modus ponens rule.

25. Differentiate between Propositional logic and Predicate logic.

26.Define Inductive inference.

27. State the advantages and disadvantages of forward chaining and backward chaining.

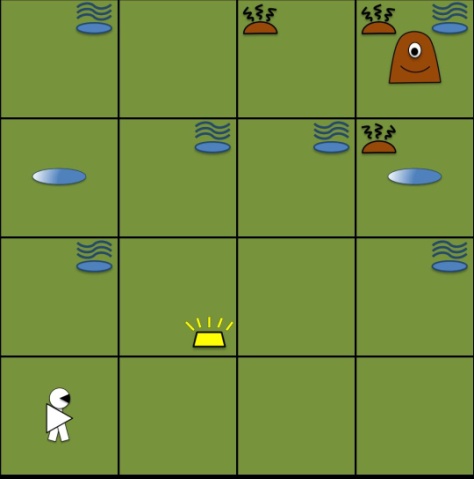
28. What is a Fuzzy set*?*

*29.* Mention the reasons for which Bayes’ theorem is intractable.

30. From a standard deck of playing cards, a single card is drawn. The probability that the card is king is 4/52, then calculate posterior probability P(King|Face), which means the drawn face card is a king card.

**PART C**

1.Explain Wumpus World Problem in detail. Create a traditional environment to understand an intelligent agent system in which it progresses to acquire gold from the mine.



2.. Elaborate the process of unification with an algorithm and show how it is lifted from propositional logic to First order logic

3. Convert the following sentences in the propositional logic to clausal form. (6)

P <=> (Q ^ ~R).

W => P.

R <=> S.

S => P.

P => (~(Q V W) V S).

4 Convert to CNF

∀X (q(X) V r(X) => s(X))

5.Using Resolution solve (6)

dog(fido)

∀(x)(dog(X)->animal(X))

∀ (Y)(animal(Y)->die(Y))

Conclusion

die(fido)

6.Explain Unification and Lifting in detail with supporting examples.

7.With appropriate examples clearly explain the difference between Propositional and Predicate Logics.

8.Explain Forward and Backward Chaining in detail with appropriate examples.

9.Explain semantic networks and what are the types of reasoning in knowledge representation?

10.Explain the process of knowledge representation using rules by highlighting the control strategies.

11. What is a Bayesian network? How is the Bayesian network used in representing uncertain knowledge? Explain the method of performing inference in Bayesian network