



BRAINWARE UNIVERSITY

Term End Examination 2019 - 20

Programme – Master of Technology in Computer Science & Engineering

Course Name – Pattern Recognition

Course Code – PEC-MCS303B

(Semester – 3)

Time allotted: 3 Hours

Full Marks: 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question)

20 x 1 = 20

1. *Choose the correct alternative from the following (Answer any Twenty)*
 - (i) Which algorithm is used for solving temporal probabilistic reasoning?

a. Hill-climbing search	b. Hidden markov model
c. Depth-first search	d. Breadth-first search
 - (ii) What are the possible values of the variable?

a. Variables	b. Literals
c. Discrete variable	d. Possible states of the world
 - (iii) Which allows for a simple and matrix implementation of all the basic algorithm?

a. HMM	b. Restricted structure of HMM
c. Temporary model	d. Reality model
 - (iv) Which reveals an improvement in online smoothing?

a. Matrix formulation	b. Revelation
c. HMM	d. None of the mentioned
 - (v) Which data structure is used to give better heuristic estimates?

a. Forwards state-space	b. Backward state-space
c. Planning graph algorithm	d. None of the mentioned
 - (vi) How many conditions are available between two actions in mutex relation?

a) 1	b) 2
c) 3	d) 4
	e)

- (vii) What is called inconsistent support?
- If two literals are not negation of other
 - If two literals are negation of other
 - Mutually exclusive
 - None of the mentioned
- (viii) Which condition is used to cease the growth of forward chaining?
- Atomic sentences
 - Complex sentences
 - No further inference
 - All of the mentioned
- (ix) What is the condition of variables in first-order literals?
- Existentially quantified
 - Universally quantified
 - Both a & b
 - None of the mentioned
- (x) Which will be the instance of the class data log knowledge bases?
- Variables
 - No function symbols
 - First-order definite clauses
 - None of the mentioned
- (xi) From where did the new fact inferred on new iteration is derived?
- Old fact
 - Narrow fact
 - New fact
 - All of the mentioned
- (xii) What will backward chaining algorithm will return?
- Additional statements
 - Substitutes matching the query
 - Logical statement
 - All of the mentioned
- (xiii) How the logic programming can be constructed?
- Variables
 - Expressing knowledge in a formal language
 - Graph
 - All of the mentioned
- (xiv) Which is omitted in prolog unification algorithm?
- Variable check
 - Occur check
 - Proposition check
 - Both b & c
- (xv) In partial order plan,
- Relationships between the actions of the behavior are set prior to the actions
 - Relationships between the actions of the behavior are not set until absolutely necessary
- Choose the correct option.
- a. is true
 - b. is true
 - Either a. or b. can be true depending upon situation
 - Neither a. nor b. is true
- (xvi) Which of the following search belongs to totally ordered plan search?
- Forward state-space search
 - Hill-climbing search
 - Depth-first search
 - Breadth-first search

- (xvii) What is the advantage of totally ordered plan in constructing the plan?
- a. Reliability
 - b. Flexibility
 - c. Easy to use
 - d. All of the mentioned
- (xviii) What is the study of light?
- a. Biology
 - b. Light logy
 - c. Photometry
 - d. All of the mentioned
- (xix) How many kinds of reflection are available in image perception?
- a. 1
 - b. 2
 - c. 3
 - d. 4
- (xx) Which is meant by assuming any two neighboring that are both edge pixels with consistent orientation?
- a. Canny edge detection
 - b. Smoothing
 - c. Segmentation
 - d. None of the mentioned
- (xxi) Traditional set theory is also known as Crisp Set theory.
- a. a. is true
 - b. b. is true
 - c. Either a. or b. can be true depending upon situation
 - d. Neither a. nor b. is true
- (xxii) The values of the set membership is represented by
- a. Discrete Set
 - b. Degree of truth
 - c. Probabilities
 - d. Both b & c
- (xxiii) Japanese were the first to utilize fuzzy logic practically on high-speed trains in Sendai.
- a. a. is true
 - b. b. is true
 - c. Either a. or b. can be true depending upon situation
 - d. Neither a. nor b. is true
- (xxiv) Which is also called single inference rule?
- a. Reference
 - b. Resolution
 - c. Reform
 - d. None of the mentioned
- (xxv) Which is not Familiar Connectives in First Order Logic?
- a. and
 - b. iff
 - c. or
 - d. not

Group – B

(Short Answer Type Questions)

4 x 5 = 20

Answer any *four* from the following

- | | |
|--|---|
| 2. Define Pattern Recognition with an example | 5 |
| 3. Define class and Classification with examples. | 5 |
| 4. What is Hausdorff distance and cosine angle? | 5 |
| 5. Write down k-Nearest Neighbour (kNN) classification algorithm | 5 |
| 6. Discuss speed-up techniques for the nearest-neighbour rule. | 5 |
| 7. Describe limitations of Bayesian decision making. | 5 |

Group – C

(Long Answer Type Questions)

3 x 10 = 30

Answer any *three* from the following

- | | |
|--|---|
| 8. (a) Explain Hierarchical clustering with different linkage metrics. | 5 |
| (b) Let the probability that a road is wet $P(w) = 0.3$. Let probability of rain, $P(R) = 0.3$. Given that 90% of the time when the roads are wet, it is because it has rained, and it has rained, calculate the posterior probability that the roads are wet. | 5 |
| 9. (a) Describe a Support Vector Machine. Define the optimization task solved in SVM learning. | 5 |
| (b) What is the difference between classification and clustering? State and explain various techniques used for clustering. | 5 |
| 10. (a) What are challenges in Bayesian decision theory? | 5 |
| (b) Discuss the general principle of Maximum likelihood estimation. | 5 |
| 11. (a) Write HMM Decoding algorithm. With the help of example explain the state sequence decoding of hidden Markov model. | 5 |
| (b) Explain Principal Component Analysis (PCA) with analytical treatment. | 5 |
| 12. (a) Write algorithm for K-means clustering with the help of diagram. Explain how the K-means clustering produces a form of stochastic hill climbing in the log likelihood function. | 5 |
| (b) Write a short note on application of normal mixture. | 5 |