BT – 027

VII Semester B.Tech. (CSE/ISE) Degree Examination, January 2022
(CBCS Scheme)
18CIPC 702 : MACHINE LEARNING

Time : 3 Hours

Max. Marks : 100

Instructions : *i) Question No. **1** is MCQ, **compulsory**.*
*ii) Question No. **2** and **3** are **compulsory**.*
*iii) Answer **any one** question from Q. No. **4** and Q. No. **5**.*
*iv) Answer **any one** question from Q. No. **6** and Q. No. **7**.*
*v) Answer **any one** question from Q. No. **8** and Q. No. **9**.*

1. Multiple Choice questions : **(15×1=15)**

1) Application of machine learning methods to large databases is called
   A) data mining
   B) artificial intelligence
   C) big data computing
   D) Internet of things

2) If machine learning model output involves target variable then that model is called as
   A) descriptive model
   B) predictive model
   C) reinforcement learning
   D) all of the above

3) In what type of learning labelled training data is used
   A) unsupervised learning
   B) supervised learning
   C) reinforcement learning
   D) active learning

4) What does dimensionality reduction reduce ?
   A) stochastics
   B) collinerity
   C) performance
   D) entropy

5) Of the following examples, which would you address using an supervised learning algorithm ?
   A) given email labeled as spam or not spam, learn a spam filter
   B) given a set of news articles found on the web, group them into set of articles about the same story
   C) given a database of customer data, automatically discover market segments and group customers into different market segments
   D) find the patterns in market basket analysis

P.T.O.

6) Which of the following is a good test dataset characteristic ?
   A) large enough to yield meaningful results
   B) is representative of the dataset as a whole
   C) both A and B
   D) none of the above

7) The output of training process in machine learning is
   A) machine learning model
   B) machine learning algorithm
   C) null
   D) accuracy

8) In neural network, the network capacity is defined as
   A) The traffic carry capacity of the network
   B) The total number of nodes in the network
   C) The number of patterns that can be stored and recalled in a network
   D) None of the above

9) Inductive learning does not involve
   A) learning by example
   B) inconsistent hypothesis
   C) consistent hypothesis
   D) none of these

10) Which of the following statements are true ?
   A) Classification and Regression are supervised learning techniques.
   B) Supervised learning is learn input and output map.
   C) Unsupervised learning is discover pattern in the input data.
   D) All of the above

11) What does the bayesian network provides ?
   A) Complete description of the domain
   B) Partial description of the domain
   C) Complete description of the problem
   D) None of the mentioned

12) How the bayesian network can be used to answer any query ?
   A) Full distribution
   B) Joint distribution
   C) Partial distribution
   D) All of the mentioned

13) What is the consequence between a node and its predecessors while creating Bayesian network ?
   A) Functionally dependent
   B) Dependant
   C) Conditionally independent
   D) None of the above

14) Where does the Bayes rule can be used ?
   A) Solving queries
   B) Increasing complexity
   C) Decreasing complexity
   D) Answering probabilistic query

15) Which of the following option is true about k-NN algorithm ?
   A) It can be used for classification
   B) It can be used for regression
   C) It can be used in both classification and regression
   D) It cannot be used in both classification and regression

2. a) Define machine learning. Discuss with examples some applications of machine learning. **7**

   b) Illustrate find S algorithm over the enjoy sport training instances given.

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	Enjoy Sport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

10

3. a) Define Bayesian theorem ? What is the relevance and features of Bayesian theorem ? Explain the practical difficulties of Bayesian theorem. **7**

   b) Define MAP hypothesis. Derive the relation for hMAP using Bayesian theorem. **10**

4. a) Describe ID3 algorithm. Calculate entropy and information gain of A1 and A2 for the following dataset.

Instance	Classification	A1	A2
1.	+	T	T
2.	+	T	T
3.	–	T	F
4.	+	F	F
5.	–	F	T
6.	–	F	T

10

b) Discuss inductive Bias in Decision Tree Learning. Differentiate between two types of biases. Why prefer short hypotheses ? 7

OR

5. a) What are issues in decision tree learning ? Explain briefly how are they overcome ? Discuss the following issues in detail :
   i) Avoiding overfitting in Decision Trees.
   ii) Incorporating continuous valued attributes. 10

b) What is a decision tree ? Write ID3 algorithm and explain. 7

6. a) Explain back propagation algorithm. Mention its limitations. 10

b) Under what conditions the perceptron rule fails and it becomes necessary to apply the delta rule. What do you mean by Gradient Descent ? 7

OR

7. a) Explain the single perceptron with its learning algorithm and its separability and convergence property. 10

b) What do you mean by Gradient descent ? What are the conditions in which Gradient descent is applied ? 7

8. a) Define sampling theory. Explain the binomial distribution in detail. 10

b) Explain locally weighted linear regression method. Derive the expression for the training rule. 7

OR

9. a) Discuss the learning tasks and Q learning in reinforcement learning approach. 7

b) Discuss the k nearest neighbor learning method with an example. 10