(2½ Hours) [Total Marks: 75]

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: **15**

a. What is business intelligence? Explain architecture of the business intelligence.
b. Explain different phases in development business intelligence system.
c. What is decision support system (DSS)? What are the factors that affect the degree of success of the DSS?
d. Explain classification of decisions according to their nature and scope.
e. Define system. Explain closed cycle and open cycle system with suitable example.
f. Describe different phases in the development of a decision support systems(DSS).

2. Attempt *any three* of the following: **15**

a. What are the phases in the development of mathematical models for decision making?
b. Explain the divisions of mathematical models according to their characteristics, probabilistic nature, temporal dimension.
c. What is data mining? List the real life applications of data mining.
d. Explain categorical and numerical attributes with proper example.
e. Differentiate between supervised and unsupervised learning.
f. Explain the following normalization techniques:
   (i) Decimal scaling
   (ii) Min-max

3. Attempt *any three* of the following: **15**

a. What are the criteria used to evaluate classification methods?
b. Explain top-down induction of decision tree. Examine the components of the top-down induction of decision trees procedure.
c. Write a short note on Naive Bayesian classifiers.
d. Write k-means algorithm for clustering.
e. Explain the 'Rosenblatt perceptron' form of neural network with diagram.
f. Write a short note on confusion matrix.

4. Attempt *any three* of the following: **15**

a. Write a short note on market basket analysis.
b. What is use of web mining methods? What are the different purposes of web mining?
c. Explain "tactical planning" optimization model for logistics planning.
d. Explain the Charnes–Cooper–Rhodes (CCR) model.
e. Write a short note on efficient frontier.
f. What is relational marketing? What are the data mining applications in the field of relational marketing?

5. **Attempt *any three* of the following:** 15

a. Define knowledge management. What are data, information and knowledge?

b. Describe the knowledge management system (KMS) cycle.

c. Describe how AI and intelligent agents support knowledge management. Relate XML to knowledge management and knowledge portals.

d. List and explain characteristics of artificial intelligence.

e. What is knowledge engineering? Explain the process of knowledge engineering.

f. What are the areas for expert system applications?
