

## Paper / Subject Code: 42671 / AI and DS - II

(03 HOURS)

(MAX. MARKS : 80)

- Note:** 1. Question No. 1 is compulsory.  
 2. Attempt **any three** questions out of remaining **five** questions.  
 3. Assume suitable data wherever necessary.  
 4. Figures to right indicate full marks.

- Q.1 Answer the following (**Any four**)
- |    |   |    |
|----|---|----|
| a. | Implement AND function using Mc-Culloch-Pitts neuron)?  | 05 |
| b. | Discuss the limitations of deterministic approaches and how probabilistic reasoning addresses these limitations with example. | 05 |
| c. | Discuss different activation function used in Neural Network  | 05 |
| d. | Compare between ANN and RNN.  | 05 |
| e. | Describe the role of utility and expected utility in decision theory with example.  | 05 |
| f. | Differentiate between Fuzzyness and Probability   | 05 |
- Q.2 a. Explain the component of ANN architecture 10  
 b. Explain the role of representing knowledge in taxonomies and ontologies, and how advanced analytics can be applied to cognitive systems. 10
- Q.3 a. Explain different types of membership functions used in fuzzy logic with suitable examples. Differentiate between crisp sets and fuzzy sets in terms of their structure, interpretation, and applicability in real-world scenarios. 10  
 b. Using Mamdani fuzzy model design a fuzzy model controller to determine the wash time of domestic washing machine. Assume the inputs are dirt & grease on cloths. Use three descriptors for each input variable & five descriptors for output variables. Derive necessary membership functions & required fuzzy rules for the application. 10
- Q.4 a. Explain Architecture of CNN in detail. List any two applications of it 10  
 b. What is Bayesian Belief Network? Explain inferencing with example. 10
- Q.5 a. Explain any 4 Metrics for evaluating classifier performance. Discuss any two cross validation methods 10  
 b. How Bagging and Boosting handle bias-variance trade-off differently, and analyze their effectiveness in dealing with noisy data and overfitting. Explain with algorithmic such as Random Forest and AdaBoost." 10
- Q.6 a. Explain the role of machine learning in multimodal applications. Discuss how different data modalities (text, audio, image, and video) are integrated to improve the performance and user experience of these systems with real time applications. 10  
 b. Define Defuzzification? Explain any two methods of Defuzzification 10

BE-IT/SEM-VII/R-19/FH-2025/04-06-2025

Paper / Subject Code: 42672 / Internet of Everything

Q.P. Code : 10083969

Pgm code : 1T01237

[3 hrs]

[80 Marks]

- Note : 1. Question 1 is compulsory  
2. Answer any three out of remaining questions  
3. Assume suitable data where required

- Q1 Solve any four
- a) Define Smart Object in IoT and its characteristics. **5 marks**
  - b) Write short note on RFID **5 marks**
  - c) Draw the Architecture diagram of Advanced Message Queuing Protocol (AMQP) with advantages **5 marks**
  - d) Explain the importance of IoT Data Analytics. **5 marks**
  - e) Explain data acquisition in IoT. **5 marks**
- Q2
- a) Describe IoT World Forum (IoTWF) standardized architecture. **10 marks**
  - b) State various operating modes of Zigbee and its topologies with diagrams. **10 marks**
- Q3
- a) Draw and explain the architecture of MQTT with diagram. **10 marks**
  - b) Explain working of Constraint Application Layer protocol (CoAP). **10 marks**
- Q4
- a) Illustrate the following i) How to create and visualize alerts in IoT? ii) What are the main challenges of IoT? **10 marks**
  - b) Explain the following terms: i) CoAP ii) Internet of Behaviour **10 marks**
- Q5
- a) Explain the architecture of LoRaWAN with its major characteristics. **10 marks**
  - b) Design the Forest Fire Detection system using IoT sensors. **10 marks**
- Q6
- a) Describe IoT enabled Smart Home Automation. **10 marks**
  - b) Explain the role of NoSQL in IoT data analytics. **10 marks**

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BE IT / Sem 7 / R 19 / FH 2025 / 06/06/2025

Paper / Subject Code: 42676 / Software Testing and Quality Assurance (DLOC III)

Prog Code: 1T01237  
SP Code: 10080374  
[Marks: 80]

(3 Hours)

- N.B.: 1) Question No. 1 is compulsory.  
2) Answer any three out of the remaining questions.  
3) Assume suitable data if necessary.  
4) Figures to the right indicate full marks.

Q1. Attempt any FOUR

(20)

- (a) Differentiate between Effective Software Testing vs Exhaustive Software Testing.
- (b) Explain Acceptance Testing.
- (c) What are the benefits of Test Suite Minimization?
- (d) Explain the cost incurred in Automation testing tools.
- (e) Compare Traditional Software Testing and Web based Software Testing..

Q2 (a) Explain the verification of Requirements and Objectives in Software testing. (10)

Q2 (b) A program reads an integer number within the range [1,100] and determines whether it is a prime number or not. Design test cases for this program using BVC, robust testing, and worst-case testing methods. (10)

Q3 (a) Explain in detail the Structure of Testing Group. (10)

Q3 (b) Explain any two Automation tools in detail. (10)

Q4 (a) Explain Agile Testing Life Cycle, along with the challenges in Agile Testing. (10)

Q4 (b) Explain McCall's quality factors and Criteria (10)

Q5 (a) What are graph metrics? Explain with an example how to calculate cyclomatic complexity using graph metrics. (10)

Q5 (b) Explain Mutation Testing in detail (10)

Q6 Write a short note on any four. (20)

- (a) ISO 9000:2000
- (b) Inspection
- (c) Classification of software matrices
- (d) Integration Testing
- (e) Validation in Software Testing

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BE IT / Sem 7 / R19 / A TKT / FN 2025 / 10-06-2025

Paper / Subject Code: 42680 / Information Retrieval Systems (DLOC - IV)

Q Code: 10082376  
Prog Code: 1T01237  
Max. Marks: 80

Time: 3 hours

N.B

1. Q.1 is compulsory
2. Attempt any three from the remaining five questions.
3. Assume suitable data, if required and state it clearly.

Q 1 Attempt all.

(20 marks)

- a. Recall objectives of Information Retrieval Process
- b. Differentiate between Information versus Data Retrieval.
- c. Identify the various task performed by web search engine.
- d. Importance of metadata and its types.

Q 2. Attempt all.

(20 marks)

- a. Show taxonomy of IR models and recall browsing models in detail.
- b. Consider a very small collection C that consists in the following three documents:
  - d1: "beautiful garden"
  - d2: "evening garden time"
  - d3: "garden time is beautiful"

Given the following query: "garden time", calculate the rank of each document using vector space retrieval model. (Use tf-idf vector for the query, and compute the score of each document in C relative to this query, using the cosine similarity measure.)

Q3. Attempt all.

(20 marks)

- a. Explain Boolean Models in detail with example.
- b. Explain Natural language modelling issues and its solution

Q.4. Attempt all.

(20 marks)

- a. What is the purpose of using keyword based query? Briefly explain any 3 types of keyword based queries.
- b. Apply Boyer Moore algorithm to construct bad match table and find the index of the given pattern for the string below with steps

String: STUDENTS ARE SMART I LIKE SMART STUDENTS  
Pattern: SMART

Q 5. Attempt all.

(20 marks)

- a. Summarize various visualization techniques with respect to user interface design.
- b. Construct a Suffixes, suffix trie and suffix tree, suffix array and supra index for the above sample text.

Roses are red. Red roses are beautiful. Many people like red roses.

Q 6. Write short note on

(20 marks)

- a. Different types of Information Systems
- b. Different markup languages and its applications.

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Duration: 3hrs

[Max Marks:80]

- N.B. : (1) Question No 1 is Compulsory.  
(2) Attempt any three questions out of the remaining five.  
(3) All questions carry equal marks.  
(4) Assume suitable data, if required and state it clearly.

- 1 Attempt any FOUR [20]  
a What are the features of Executive Support System?  
b Define Information security with an example.  
c Define topology and its types with advantages and disadvantages.  
d Give an Overview of System Development?  
e Describe the tools that augment the traditional SDLC.
- 2 a List down the types of support provided by Accounting IS, finance IS, [10]  
production/operations management (POM) IS, marketing IS, and human  
resources IS.  
b Analyse the main reasons of Computer Crimes. [10]
- 3 a What do you mean by office automation system. [10]  
b Briefly describe the benefits of social commerce to customers. [10]
- 4 a Explain CRM. Describe the different types of CRM with example. [10]  
b Write note on mobile-commerce. [10]
- 5 a Describe the privacy issues affected by IT. [10]  
b Give examples of B2B and B2C Business Models and contribution of MIS to [10]  
control these models.
- 6 a What is Decision Support System. Explain the application of DSS. [10]  
b What is Cloud Computing? Explain its models? [10]

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