MODEL PAPER – 1
Bachelor of Computer Application (BCA)– Semester 4
Paper: Artificial Intelligence
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define Artificial Intelligence and explain its scope.

b) Explain intelligent agents and their types.

c) Define rationality in AI.

d) Explain Wumpus World problem.

e) Define problem-solving agent.

f) Explain Breadth First Search (BFS).

g) Define propositional logic.

h) Explain expert systems.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain structure of intelligent agents and types of environments.
OR
(b) Explain knowledge-based agents with suitable example.

3.(a) Explain uninformed search techniques including BFS and DFS.
OR
(b) Explain informed search techniques including Best First and A* search.

4.(a) Explain propositional logic and inference mechanisms.
OR
(b) Explain forward and backward chaining with examples.

5.(a) Explain expert systems and their architecture.
OR
(b) Explain applications of AI in different domains.

MODEL PAPER – 2
Bachelor of Computer Application (BCA)– Semester 4
Paper: Artificial Intelligence
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define agent environment and classify environments.

b) Explain depth first search (DFS).

c) Define iterative deepening search.

d) Explain minimax algorithm.

e) Define constraint satisfaction problem (CSP).

f) Explain unification in AI.

g) Define fuzzy logic.

h) Explain Natural Language Processing (NLP).

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain types of agents and rational agents with examples.
OR
(b) Explain problem-solving agents and search formulation.

3.(a) Explain advanced search techniques including DFS and iterative deepening.
OR
(b) Explain adversarial search including minimax and alpha-beta pruning.

4.(a) Explain first-order predicate logic and inference mechanisms.
OR
(b) Explain resolution and truth maintenance systems.

5.(a) Explain constraint satisfaction problems and backtracking search.
OR
(b) Explain domains of AI including machine learning, robotics, and NLP

MODEL PAPER – 3
Bachelor of Computer Application (BCA)– Semester 4
Paper: Artificial Intelligence
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)
1.

a) Define knowledge-based agent.

b) Explain Best First Search.

c) Define A* search algorithm.

d) Explain Alpha-Beta pruning.

e) Define forward chaining.

f) Explain backward chaining.

g) Define STRIPS.

h) Explain expert system architecture.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain intelligent agents and structure of agents with environment types.
OR
(b) Explain knowledge-based agents and Wumpus World problem.

3.(a) Explain informed search techniques including Best First and A* search.
OR
(b) Explain adversarial search including minimax and alpha-beta pruning.

4.(a) Explain first-order logic and unification process with examples.
OR
(b) Explain inference techniques including resolution method.

5.(a) Explain planning techniques including Blocks World and STRIPS.
OR
(b) Explain applications of AI and ethical issues in AI.

MODEL PAPER – 4
Bachelor of Computer Application (BCA)– Semester 4
Paper: Artificial Intelligence
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.a) Define rational agent and performance measure.

b) Explain AO* search algorithm.

c) Define genetic algorithm.

d) Explain game tree.

e) Define resolution in AI.

f) Explain non-monotonic reasoning.

g) Define probabilistic reasoning.

h) Explain computer vision.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain types of environments and their properties in AI.
OR
(b) Explain structure of intelligent agents with suitable examples.

3.(a) Explain uninformed search techniques including BFS, DFS, and iterative deepening.
OR
(b) Explain evolutionary search techniques including genetic algorithms.

4.
(a) Explain propositional logic and resolution method with examples.
OR
(b) Explain handling uncertainty using probabilistic and fuzzy reasoning.

5.
(a) Explain expert systems and their applications with case studies.
OR
(b) Explain domains of AI including machine learning, robotics, and deep learning.

MODEL PAPER – 5
Bachelor of Computer Application (BCA)– Semester 4
Paper: Artificial Intelligence
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)
1.

a) Define intelligent agent architecture.

b) Explain nature of environment in AI.

c) Define heuristic function.

d) Explain constraint propagation.

e) Define truth maintenance system.

f) Explain Blocks World problem.

g) Define expert system components.

h) Explain ethical issues in AI.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain intelligent agents and rationality with suitable examples.
OR
(b) Explain knowledge-based agents and inference mechanism.

3.(a) Explain heuristic search techniques including A* algorithm with example.
OR
(b) Explain adversarial search including minimax algorithm with example.

4.(a) Explain first-order logic and inference techniques with examples.
OR
(b) Explain constraint satisfaction problems and backtracking algorithm.

5.(a) Explain expert systems with architecture and applications.
OR
(b) Explain domains of AI and future scope of AI.

UNIT WISE IMPORTANT QUESTIONS

UNIT – I (Introduction & Intelligent Agents)

- Definition and scope of Artificial Intelligence
- Intelligent agents and environment
- Rational agents
- Types of environments
- Structure of intelligent agents
- Knowledge-based agents
- Wumpus World problem
- Problem-solving agents

UNIT – II (Search Techniques & Games)

- Uninformed search (DFS, BFS)
- Iterative deepening search
- Informed search (Best First, A*)
- AO* algorithm
- Minimax algorithm
- Alpha-Beta pruning
- Constraint Satisfaction Problems (CSP)
- Backtracking search
- Genetic algorithms

UNIT – III (Logic & Reasoning)

- Propositional logic
- First-order predicate logic
- Unification
- Forward and backward chaining
- Resolution
- Truth maintenance systems

- Planning (Blocks World, STRIPS) ⭐⭐⭐⭐⭐
- Probabilistic reasoning ⭐⭐⭐⭐⭐
- Fuzzy logic ⭐⭐⭐⭐⭐

UNIT – IV (Applications & Expert Systems)

- Machine Learning basics ⭐⭐⭐⭐⭐
- Computer Vision ⭐⭐⭐⭐
- Robotics ⭐⭐⭐⭐⭐
- Natural Language Processing ⭐⭐⭐⭐⭐
- Deep Neural Networks ⭐⭐⭐⭐
- Expert systems ⭐⭐⭐⭐⭐
- Architecture of expert systems ⭐⭐⭐⭐⭐
- Applications of AI ⭐⭐⭐⭐⭐
- Ethical issues in AI ⭐⭐⭐⭐⭐

MODEL PAPER – 1
Bachelor of Computer Application (BCA)– Semester 4
Paper: Data Mining & Warehousing
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

a) Define data mining and explain its functionalities.

b) Explain data preprocessing techniques.

c) Define data cleaning with examples.

d) Explain data integration and transformation.

e) Define data warehouse.

f) Explain OLTP systems.

g) Define association rules.

h) Explain classification in data mining.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain data preprocessing including cleaning, integration, and reduction.
OR
(b) Explain discretization and concept hierarchies.

3.(a) Explain data warehouse architecture and characteristics.
OR
(b) Explain OLTP and OLAP with differences.

4.(a) Explain association rule mining and Apriori algorithm.
OR
(b) Explain FP-tree algorithm with examples.

5.(a) Explain classification techniques including decision trees.
OR
(b) Explain Naïve Bayes classification and prediction.

MODEL PAPER – 2
Bachelor of Computer Application (BCA)– Semester 4
Paper: Data Mining & Warehousing
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

a) Define data mining tasks and explain their significance.

b) Discuss data reduction techniques.

c) Explain discretization methods.

d) Define OLAP and its operations.

e) Differentiate between OLTP and OLAP systems.

f) Define support and confidence in association rules.

g) Explain multi-dimensional association rules.

h) Define classification accuracy.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain data preprocessing steps and their importance in data mining.
OR
(b) Discuss data cleaning and transformation techniques with examples.

3.(a) Explain data warehouse design approaches (Top-down and Bottom-up).
OR
(b) Discuss characteristics, advantages, and applications of data warehouse.

4.(a) Explain Apriori algorithm with step-by-step example.
OR
(b) Explain FP-growth algorithm and its advantages over Apriori.

5.(a) Explain decision tree induction with example.
OR
(b) Explain Naïve Bayes classifier and prediction techniques

MODEL PAPER – 3
Bachelor of Computer Application (BCA)– Semester 4
Paper: Data Mining & Warehousing
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

a) Define data mining architecture.

b) Explain concept hierarchy generation.

c) Define data cube.

d) Explain OLAP operations.

e) Define frequent itemsets.

f) Explain confidence measure in association rules.

g) Define prediction in data mining.

h) Explain classifier accuracy measures.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain data preprocessing techniques including transformation and reduction.
OR
(b) Explain discretization methods and concept hierarchies with examples.

3.(a) Explain data warehouse architecture and types of data warehouses.
OR
(b) Explain OLAP operations with suitable examples.

4.(a) Explain association rule mining including Apriori algorithm with example.
OR
(b) Explain FP-tree algorithm and its working with example.

5.(a) Explain classification using decision tree with suitable example.
OR
(b) Explain Naïve Bayesian classification and prediction techniques.

MODEL PAPER – 4

Bachelor of Computer Application (BCA)– Semester 4
Paper: Data Mining & Warehousing
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

a) Define data integration with example.

b) Explain data transformation techniques.

c) Define metadata in data warehouse.

d) Explain star schema.

e) Define lift in association rules.

f) Explain multilevel association rules.

g) Define overfitting in classification.

h) Explain confusion matrix.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain data preprocessing including cleaning, integration, and transformation.
OR
(b) Explain data reduction and discretization techniques with examples.

3.(a) Explain data warehouse schemas (star, snowflake) with diagrams.
OR
(b) Explain tools and development methodologies of data warehouse.

4.(a) Explain association rule mining including support, confidence, and lift.
OR
(b) Explain Apriori algorithm with detailed example.

5.(a) Explain classification techniques and issues in classification.
OR
(b) Explain decision tree and Naïve Bayes classifier with examples.

MODEL PAPER – 5
Bachelor of Computer Application (BCA)– Semester 4
Paper: Data Mining & Warehousing
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

a) Define data mining system architecture.

b) Explain concept hierarchy with examples.

c) Define OLAP cube.

d) Explain slicing and dicing operations.

e) Define FP-tree.

f) Explain frequent pattern mining.

g) Define classification model.

h) Explain prediction techniques.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain data preprocessing including cleaning, integration, transformation, and reduction.
OR
(b) Explain discretization and concept hierarchy generation techniques.

3.(a) Explain data warehouse architecture, types, and characteristics.
OR
(b) Explain OLAP operations and data cube with examples.

4.(a) Explain association rule mining including Apriori algorithm with suitable example.
OR
(b) Explain FP-growth algorithm and compare it with Apriori.

5.(a) Explain classification techniques including decision tree and Naïve Bayes.
OR
(b) Explain prediction techniques and evaluation of classifier accuracy.

MODEL PAPER – 6
Bachelor of Computer Application (BCA)– Semester 4
Paper: Data Mining & Warehousing
Time: 3 Hours | Max Marks: 70

◇ SECTION – A
Answer any SIX questions (6 × 5 = 30 Marks)

a) Define data mining and its functionalities.

b) Explain data preprocessing.

c) Define data warehouse.

d) Explain OLAP operations.

e) Define association rules.

f) Explain Apriori algorithm.

g) Define classification.

h) Explain decision tree.

◇ SECTION – B

2.(a) Explain data preprocessing techniques.
OR
(b) Explain data cleaning and integration.

3.(a) Explain data warehouse and OLTP vs OLAP.
OR
(b) Explain data cube and OLAP operations.

4.(a) Explain association rule mining and Apriori algorithm.
OR
(b) Explain FP-tree algorithm.

5.(a) Explain classification techniques.

OR

(b) Explain Naïve Bayes and prediction.

UNIT WISE IMPORTANT QUESTIONS

UNIT – I (Data Mining & Pre-processing)

- Define Data Mining and explain its functionalities
- Explain data preprocessing and its importance
- Describe data cleaning techniques
- Explain data integration with examples
- Discuss data transformation methods
- Explain data reduction techniques
- Define discretization with suitable examples
- Explain concept hierarchies

UNIT – II (Data Warehouse & OLAP)

- Define Data Warehouse and its characteristics
- Explain OLTP and OLAP systems
- Differentiate between OLTP and OLAP
- Explain data warehouse architecture
- Discuss top-down and bottom-up approaches
- Explain data cubes
- Explain OLAP operations (roll-up, drill-down, slice, dice)
- Discuss applications of data warehouse

UNIT – III (Association Rule Mining)

- Define association rule mining
- Explain support and confidence
- Explain single-dimensional association rules
- Explain multi-level association rules
- Explain multi-dimensional association rules
- Explain Apriori algorithm with example
- Explain FP-tree algorithm

UNIT – IV (Classification & Prediction)

- Define classification and prediction

- Explain decision tree induction ⭐⭐⭐⭐⭐
- Explain Naïve Bayes classification ⭐⭐⭐⭐⭐
- Explain classification based on association rules ⭐⭐⭐⭐⭐
- Discuss issues in classification ⭐⭐⭐⭐⭐
- Explain classifier accuracy ⭐⭐⭐⭐⭐

MODEL PAPER – 1
Bachelor of Computer Application (BCA)– Semester 4
Paper: Database Management System
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define database system and explain its characteristics.

b) Discuss advantages and limitations of DBMS.

c) Explain various data models with suitable examples.

d) Differentiate between super key, candidate key, and primary key.

e) Describe the concept of ER model with examples.

f) Explain selection and projection operations in relational algebra.

g) Define SQL and classify its sublanguages.

h) Explain functional dependency with example.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Discuss database environment and responsibilities of DBA in detail.
OR
(b) Explain relational model and constraints in database design.

3.(a) Illustrate ER diagram with strong and weak entity sets.
OR
(b) Explain relational algebra operations including join and division.

4.(a) Explain SQL queries using DDL and DML with suitable examples.
OR
(b) Discuss aggregate functions, grouping, and ordering in SQL.

5.(a) Explain normalization process up to BCNF with examples.
OR
(b) Discuss transaction management and ACID properties.

MODEL PAPER – 2
Bachelor of Computer Application (BCA)– Semester 3
Paper: Database Management System
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define database application and its importance.

b) Explain hierarchical and network data models.

c) Define composite and surrogate keys.

d) Explain relational schema.

e) Define tuple relational calculus.

f) Explain logical operators in SQL.

g) Define closure of functional dependencies.

h) Explain denormalization.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain database design concepts and constraints with examples.
OR
(b) Compare relational and object-oriented data models.

3.(a) Explain relational algebra operations including set operations.
OR
(b) Explain SQL joins (inner, outer, equi) with examples.

4.(a) Explain views and their advantages.
OR
(b) Explain stored procedures and triggers with examples.

5.(a) Explain normalization process with functional dependencies.
OR
(b) Explain concurrency control and serializability.

MODEL PAPER – 3
Bachelor of Computer Application (BCA)– Semester 3
Paper: Database Management System
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define metadata and database schema.

b) Explain roles of database administrator.

c) Define weak entity set.

d) Explain domain relational calculus.

e) Define group by and having clause.

f) Explain recursive queries.

g) Define BCNF.

h) Explain locking mechanism.

◇ SECTION – B

2.(a) Explain ER model with key constraints and extended features.
OR
(b) Explain relational schema and mapping from ER model.

3.(a) Explain relational algebra with division and join operations.
OR
(b) Explain SQL queries including subqueries and nested queries.

4.(a) Explain advanced SQL including cursors and packages.
OR
(b) Explain normalization and anomalies with examples.

5.(a) Explain transaction management and concurrency control techniques.
OR
(b) Explain indexing and file organization in databases.

MODEL PAPER – 4
Bachelor of Computer Application (BCA)– Semester 3
Paper: Database Management System
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define database application and its importancea) Define DBMS and explain its advantages over file system.

b) Explain different types of keys with examples.

c) Describe ER model with strong and weak entities.

d) Explain selection and join operations in relational algebra.

e) Define functional dependency and its types.

f) Explain ACID properties of transactions.

g) Define normalization and explain 2NF.

h) Explain indexing and its types.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain ER diagram with attributes, relationships, and constraints.
OR
(b) Explain relational model and integrity constraints.

3.(a) Explain relational algebra operations including join and division with examples.
OR
(b) Write SQL queries using joins, aggregate functions, and grouping.

4.(a) Explain normalization up to BCNF with suitable examples.
OR
(b) Explain advanced SQL concepts including views, triggers, and procedures.

5.(a) Explain transaction management and concurrency control mechanisms.
OR
(b) Explain indexing techniques and performance tuning.

MODEL PAPER – 5
Bachelor of Computer Application (BCA)– Semester 3
Paper: Database Management System
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)
1.

a) Define database application and its importancea) Define database system and explain its components

b) Differentiate between hierarchical and relational data models.

c) Define super key and candidate key with examples.

d) Explain attributes and relationships in ER model.

e) Define tuple relational calculus.

f) Explain aggregate functions in SQL.

g) Define functional dependency and its properties.

h) Explain ACID properties with example.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain ER model with key constraints and weak entity sets.
OR
(b) Explain relational model and integrity constraints with examples.

3.(a) Explain relational algebra operations including join and division.
OR
(b) Write SQL queries using joins, GROUP BY, HAVING, and ORDER BY clauses.

4.(a) Explain normalization process up to BCNF with suitable examples.
OR
(b) Explain advanced SQL including views, triggers, and stored procedures.

5.(a) Explain transaction management and concurrency control mechanisms.

OR

(b) Explain indexing techniques and file organization in databases.

UNIT WISE IMPORTANT QUESTIONS

UNIT – I (DBMS Basics & ER Model)

- Definition of DBMS and its advantages ★★★★★
- Database users and DBA roles ★★★★★
- Types of data models ★★★★★
- Keys (Primary, Candidate, Foreign, etc.) ★★★★★
- Constraints in DBMS ★★★★★
- ER model ★★★★★
- Entities, attributes, relationships ★★★★★
- Weak entity sets ★★★★★
- ER diagram ★★★★★
- Relational model and schema ★★★★★

UNIT – II (Relational Algebra & SQL)

- Relational algebra operations ★★★★★
- Selection, projection, join ★★★★★
- Set operations and division ★★★★★
- Relational calculus ★★★★
- SQL basics (DDL, DML) ★★★★★
- Aggregate functions ★★★★★
- Logical operators ★★★★★
- GROUP BY, HAVING, ORDER BY ★★★★★
- SQL joins (inner, outer) ★★★★★

UNIT – III (Advanced SQL & Normalization)

- Views ★★★★★
- Triggers ★★★★★
- Stored procedures ★★★★★
- Cursors ★★★★
- Functional dependencies ★★★★★
- Armstrong's axioms ★★★★★
- Normalization (1NF, 2NF, 3NF, BCNF) ★★★★★

- Closure of functional dependencies ⭐⭐⭐⭐⭐
- Denormalization ⭐⭐⭐⭐

UNIT – IV (Transactions & Indexing)

- Transactions ⭐⭐⭐⭐⭐
- ACID properties ⭐⭐⭐⭐⭐
- Concurrency control ⭐⭐⭐⭐⭐
- Serializability ⭐⭐⭐⭐⭐
- Two-phase locking (2PL) ⭐⭐⭐⭐⭐
- Deadlocks ⭐⭐⭐⭐⭐
- Recovery techniques ⭐⭐⭐⭐⭐
- File organization ⭐⭐⭐⭐⭐
- Indexing ⭐⭐⭐⭐⭐
- Performance tuning ⭐⭐⭐⭐

MODEL PAPER – 1
Bachelor of Computer Application (BCA)– Semester 4
Paper: Theory of Computation
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define system software and its types.

b) Explain stages of compilation.

c) Define tokens in computer languages.

d) Explain regular expressions.

e) Define finite state automata.

f) Explain context-free grammar.

g) Define intermediate code.

h) Explain code generation.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain computer hardware and system software with examples.
OR
(b) Explain evolution of compilers and stages of compilation.

3.(a) Explain lexical analysis and token recognition.
OR
(b) Explain syntax analysis and types of parsers.

4.(a) Explain intermediate code generation and semantic analysis.
OR
(b) Explain code optimization techniques and basic blocks.

5.(a) Explain code generation and issues involved in it.
OR
(b) Explain compiler writing tools including lexical and syntactic tools.

MODEL PAPER – 2
Bachelor of Computer Application (BCA)– Semester 4
Paper: Theory of Computation
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define compiler and its functions.

b) Explain man-machine communication spectrum.

c) Define alphabets in computer languages.

d) Explain token recognition process.

e) Define parser.

f) Explain top-down parsing.

g) Define semantic analysis.

h) Explain optimization.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain design of a programming language and its features.
OR
(b) Explain theory of computer languages and its importance.

3.(a) Explain lexical analysis using finite state automata.
OR
(b) Explain bottom-up parsing with suitable examples.

4.(a) Explain types of intermediate code with examples.
OR
(b) Explain construction of basic blocks and their processing.

5.(a) Explain target machine architecture in code generation.
OR
(b) Explain compiler writing tools such as Lex and Yacc.

MODEL PAPER – 3
Bachelor of Computer Application (BCA)– Semester 4
Paper: Theory of Computation
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define language processor.

b) Explain phases of compiler.

c) Define regular language.

d) Explain deterministic finite automata (DFA).

e) Define parsing.

f) Explain shift-reduce parsing.

g) Define code optimization.

h) Explain intermediate representation.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain system software and types of translators (compiler, interpreter, assembler).
OR
(b) Explain stages of compilation with neat diagram.

3.(a) Explain lexical analysis and construction of DFA for token recognition.
OR
(b) Explain parsing techniques with comparison of top-down and bottom-up parsers.

4.(a) Explain intermediate code generation with examples.
OR
(b) Explain optimization techniques and importance of optimized code.

5.(a) Explain code generation with issues and target machine considerations.
OR
(b) Explain compiler tools including Lex and Yacc with their roles.

MODEL PAPER – 4
Bachelor of Computer Application (BCA)– Semester 4
Paper: Theory of Computation
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define compiler phases.

b) Explain structure of compiler.

c) Define tokens and lexemes.

d) Explain non-deterministic finite automata (NFA).

e) Define context-free grammar.

f) Explain recursive descent parsing.

g) Define basic block.

h) Explain code generation issues.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain man-machine communication and system software classification.
OR
(b) Explain evolution of compilers and language design aspects.

3.(a) Explain lexical analysis with regular expressions and automata.
OR
(b) Explain parser types and working of top-down parsing.

4.(a) Explain semantic analysis and intermediate code generation.
OR
(b) Explain code optimization techniques with examples.

5.(a) Explain target machine architecture and code generation process.
OR
(b) Explain compiler tools and their importance in compilation.

MODEL PAPER – 5
Bachelor of Computer Application (BCA)– Semester 4
Paper: Theory of Computation
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define compiler and interpreter.

b) Explain language design concepts.

c) Define regular expression and its applications.

d) Explain lexical analyzer role.

e) Define parser generator.

f) Explain semantic rules.

g) Define code optimization techniques.

h) Explain compiler tools.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain stages of compilation with detailed explanation.
OR
(b) Explain system software and language processors.

3.(a) Explain lexical analysis with token representation and FSA.
OR
(b) Explain syntax analysis and parser types with examples.

4.(a) Explain intermediate code generation and semantic analysis.
OR
(b) Explain optimization and construction of basic blocks.

5.(a) Explain code generation process and issues involved.
OR
(b) Explain compiler writing tools such as Lex and Yacc.

MODEL PAPER – 6
Bachelor of Computer Application (BCA)– Semester 4
Paper: Theory of Computation
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define compiler and its phases.

b) Explain tokens and lexical analysis.

c) Define finite automata.

d) Explain parsing.

e) Define intermediate code.

f) Explain optimization.

g) Define code generation.

h) Explain compiler tools.

◇ SECTION – B

2.(a) Explain system software and compiler structure.
OR
(b) Explain stages of compilation.

3.(a) Explain lexical analysis using automata.
OR
(b) Explain parsing techniques and parser types.

4.(a) Explain intermediate code and semantic analysis.
OR
(b) Explain code optimization techniques.

5.(a) Explain code generation and target machine.
OR
(b) Explain compiler tools (Lex & Yacc).

UNIT WISE IMPORTANT QUESTIONS

UNIT – I (Basics & Compiler Introduction)

- Definition of system software
- Types of system software
- Man-machine communication
- Compiler and its functions
- Evolution of compilers
- Stages of compilation
- Design of programming languages
- Theory of computer languages

UNIT – II (Lexical & Syntax Analysis)

- Tokens, lexemes, and patterns
- Regular expressions
- Finite automata (DFA/NFA)
- Token recognition
- Lexical analysis
- Context-free grammar
- Parsing techniques
- Top-down parsing
- Bottom-up parsing
- Yacc tool

UNIT – III (Intermediate Code & Optimization)

- Intermediate code generation
- Types of intermediate code
- Semantic analysis
- Syntax-directed translation
- Code optimization
- Basic blocks
- Optimization techniques

UNIT – IV (Code Generation & Tools)

- Code generation
- Issues in code generation

- Target machine architecture ⭐ ⭐ ⭐ ⭐ ⭐
- Compiler writing tools ⭐ ⭐ ⭐ ⭐ ⭐
- Lex tool ⭐ ⭐ ⭐ ⭐ ⭐
- Yacc tool ⭐ ⭐ ⭐ ⭐ ⭐
- Role of compiler tools ⭐ ⭐ ⭐ ⭐

MODEL PAPER – 1
Bachelor of Computer Application (BCA)– Semester 4
Paper: Web Technologies
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define HTML and explain basic structure of HTML document.

b) Explain hyperlinks and image tags in HTML.

c) Define lists and explain types of lists.

d) Explain CSS and its types.

e) Define JavaScript and its features.

f) Explain operators in JavaScript.

g) Define functions in JavaScript.

h) Explain XML and its structure.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain HTML forms and form elements with examples.
OR
(b) Explain tables and frames in HTML.

3.(a) Explain CSS including inline, embedded, and external styles.
OR
(b) Explain JavaScript control statements with examples.

4.(a) Explain JavaScript functions and arrays with examples.
OR
(b) Explain JavaScript objects including Math and String objects.

5.(a) Explain event handling in JavaScript with examples.
OR
(b) Explain XML, DTD, and XML schema.

MODEL PAPER – 2
Bachelor of Computer Application (BCA)– Semester 3
Paper: Web Technologies
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Explain document body elements in HTML.

b) Define formatting tags with examples.

c) Explain CSS box model.

d) Define background properties in CSS.

e) Explain input using prompt in JavaScript.

f) Define decision-making statements in JavaScript.

g) Explain scope rules in JavaScript.

h) Define DOM (Document Object Model).

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain text formatting and color usage in HTML with examples.
OR
(b) Explain lists and image handling in HTML.

3.(a) Explain CSS properties including text flow and background.
OR
(b) Explain JavaScript looping statements with examples.

4.(a) Explain JavaScript functions including recursion and global functions.
OR
(b) Explain JavaScript objects including Date and Boolean objects.

5.(a) Explain event model in JavaScript with examples.
OR
(b) Explain XML namespaces and DTD.

MODEL PAPER – 3
Bachelor of Computer Application (BCA)– Semester 3
Paper: Web Technologies
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define HTML attributes with examples.

b) Explain tables and their attributes.

c) Define external style sheets.

d) Explain arithmetic operators in JavaScript.

e) Define switch statement in JavaScript.

f) Explain arrays in JavaScript.

g) Define window object.

h) Explain XML schema.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain HTML document structure and formatting elements.
OR
(b) Explain forms and input elements in HTML.

3.(a) Explain CSS including linking external style sheets and box model.
OR
(b) Explain control structures including if-else and switch statements.

4.(a) Explain JavaScript arrays and objects with examples.
OR
(b) Explain document and window objects in JavaScript.

5.(a) Explain event handling and DHTML events in JavaScript.
OR
(b) Explain XML, namespaces, and schema documents.

MODEL PAPER – 4
Bachelor of Computer Application (BCA)– Semester 3
Paper: Web Technologies
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define frames in HTML.

b) Explain form controls in HTML.

c) Define inline styles with example.

d) Explain logical operators in JavaScript.

e) Define break and continue statements.

f) Explain recursion in JavaScript.

g) Define String object.

h) Explain DTD in XML.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain images and color usage in HTML with examples.
OR
(b) Explain frames and forms with suitable examples.

3.(a) Explain CSS properties including backgrounds and text flow.
OR
(b) Explain JavaScript operators and expressions with examples.

4.(a) Explain functions and scope rules in JavaScript.
OR
(b) Explain JavaScript objects including Math and Date objects.

5.(a) Explain event handling including mouse and form events.
OR
(b) Explain XML basics and document structure.

MODEL PAPER – 5
Bachelor of Computer Application (BCA)– Semester 3
Paper: Web Technologies
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define HTML document structure and elements.

b) Explain image mapping in HTML.

c) Define embedded style sheets.

d) Explain increment and decrement operators.

e) Define loop control statements.

f) Explain global functions in JavaScript.

g) Define Date object.

h) Explain XML DOM.

◇ SECTION – B

Answer ALL questions (4 × 10 = 40 Marks)

2.(a) Explain HTML elements including lists, tables, and hyperlinks.
OR
(b) Explain forms and interactive elements in HTML.

3.(a) Explain CSS including inline, embedded, and external styles with examples.
OR
(b) Explain JavaScript control structures and loops with examples.

4.(a) Explain JavaScript functions including recursion and scope rules.
OR
(b) Explain JavaScript objects including String, Number, and Boolean objects.

5.(a) Explain event model and dynamic HTML events.
OR
(b) Explain XML, DOM, and XML schema documents.

MODEL PAPER – 6
Bachelor of Computer Application (BCA)– Semester 3
Paper: Web Technologies
Time: 3 Hours | Max Marks: 70

◇ SECTION – A

Answer any SIX questions (6 × 5 = 30 Marks)

1.

a) Define HTML and its structure.

b) Explain CSS types.

c) Define JavaScript and its features.

d) Explain operators in JavaScript.

e) Define functions.

f) Explain arrays.

g) Define event handling.

h) Explain XML basics.

◇ SECTION – B

2.(a) Explain HTML forms and elements.
OR
(b) Explain tables and images in HTML.

3.(a) Explain CSS properties and box model.
OR
(b) Explain control structures in JavaScript.

4.(a) Explain JavaScript functions and objects.
OR
(b) Explain arrays and string handling.

5.(a) Explain event handling and DOM.
OR
(b) Explain XML, DTD, and schema.

UNIT WISE IMPORTANT QUESTIONS

UNIT – I (HTML & CSS)

- Basic structure of HTML document ⭐⭐⭐⭐⭐
- HTML tags and attributes ⭐⭐⭐⭐⭐
- Hyperlinks and images ⭐⭐⭐⭐⭐
- Lists and tables ⭐⭐⭐⭐⭐
- Frames and forms ⭐⭐⭐⭐⭐
- Form elements and input types ⭐⭐⭐⭐⭐
- Introduction to CSS ⭐⭐⭐⭐⭐
- Inline, Embedded, External CSS ⭐⭐⭐⭐⭐
- CSS box model ⭐⭐⭐⭐⭐
- Background and text formatting ⭐⭐⭐⭐

UNIT – II (JavaScript Basics)

- Introduction to JavaScript ⭐⭐⭐⭐⭐
- Variables and data types ⭐⭐⭐⭐⭐
- Operators in JavaScript ⭐⭐⭐⭐⭐
- Conditional statements (if, switch) ⭐⭐⭐⭐⭐
- Looping statements (for, while, do-while) ⭐⭐⭐⭐⭐
- Break and continue ⭐⭐⭐⭐
- Input using prompt ⭐⭐⭐⭐⭐

UNIT – III (Functions & Objects)

- Functions in JavaScript ⭐⭐⭐⭐⭐
- Function definition and calling ⭐⭐⭐⭐⭐
- Scope rules ⭐⭐⭐⭐⭐
- Recursion ⭐⭐⭐⭐⭐
- Arrays in JavaScript ⭐⭐⭐⭐⭐
- JavaScript objects ⭐⭐⭐⭐⭐
- Math object ⭐⭐⭐⭐⭐
- String object ⭐⭐⭐⭐⭐
- Date object ⭐⭐⭐⭐⭐
- Window and document objects ⭐⭐⭐⭐⭐

UNIT – IV (Events & XML)

- Event handling in JavaScript ⭐⭐⭐⭐⭐
- Common events (onclick, onload, onsubmit) ⭐⭐⭐⭐⭐
- Dynamic HTML (DHTML) ⭐⭐⭐⭐⭐
- Introduction to XML ⭐⭐⭐⭐⭐
- XML structure and syntax ⭐⭐⭐⭐⭐
- XML Namespaces ⭐⭐⭐⭐⭐
- DTD (Document Type Definition) ⭐⭐⭐⭐⭐
- XML Schema ⭐⭐⭐⭐⭐
- DOM (Document Object Model) ⭐⭐⭐⭐⭐
- XSLT ⭐⭐⭐⭐