

---

Table of Contents

---

Chapter 1: Introduction to Databases .....	1
1.1 Data .....	2
1.2 Information .....	3
1.3 Difference between Data and Information .....	4
1.4 Metadata .....	4
1.5 File Processing System .....	5
1.6 Database .....	6
1.7 Database Management System .....	8
1.8 Components of Database Environment .....	8
1.9 Database Approach .....	9
1.10 Difference between File and Database Approach .....	12
1.11 Application Program .....	13
1.12 Range of Database Applications.....	14
1.13 Types of Users .....	15
1.14 History of Database Systems .....	16
Short Questions .....	18
Multiple Choice Questions .....	21
True/False Questions .....	24
<hr/>	
Chapter 2: Database Environment .....	26
2.1 Three-Level Architecture.....	28
2.2 Mapping .....	30
2.3 Data Independence.....	32
2.4 Database Models .....	33
2.5 Types of Database Models .....	34
2.6 Functions of DBMS .....	40
2.7 Database Development Process .....	41
2.8 System Development Life Cycle .....	42
2.9 Staged Database Design Approach.....	43
2.10 Design Tools .....	45
2.11 Database Administrator (DBA).....	48
2.12 Data Administrator (DA) .....	50
2.13 Data Dictionary .....	50
Short Questions .....	52
Multiple Choice Questions.....	55
True/False Questions .....	56
<hr/>	
Chapter 3: Entity Relationship Model .....	57
3.1 Entity Relationship Model .....	59
3.2 Elements of E-R Model .....	59
3.3 E-R Diagram .....	61
3.4 Degree of Relationships.....	65
3.5 Subtype & Supertype Entities .....	71
E-R Project 1.....	73
E-R Project 2.....	73
E-R Project 3.....	74

E-R Project 4.....	74
E-R Project 5.....	75
E-R Project 6.....	76
Short Questions.....	78
Multiple Choice Questions.....	82
True/False Questions.....	85

---

Chapter 4: Semantic Object Model .....	87
4.1 Semantic Object Model .....	88
4.2 Semantic Objects .....	88
4.3 Attribute Domains .....	91
4.4 Semantic Object Views .....	91
4.5 Types of Objects .....	92
Short Questions.....	96
Multiple Choice Questions.....	99
True/False Questions .....	102

---

Chapter 5: Relational Model & Normalization .....	103
5.1 Relational Model .....	105
5.2 Relational Keys .....	107
5.3 Relational Database Management System.....	110
5.4 Types of Relations .....	111
5.5 Properties of Relations.....	112
5.6 Codd's Rules.....	113
5.7 Relational Data Integrity.....	114
5.8 Database Languages .....	116
5.9 Relational Algebra .....	117
5.10 Joins .....	122
5.11 Relational Calculus .....	126
5.12 Relational Algebra vs. Relational Calculus .....	127
5.13 Normalization .....	127
5.14 Functional Dependency .....	128
5.15 First Normal Form .....	129
5.16 Full Functional Dependency .....	130
5.17 Second Normal Form .....	131
5.18 Transitive Dependency .....	132
5.19 Third Normal Form.....	133
5.20 Boyce-Codd Normal Form .....	134
5.21 Fourth Normal Form.....	135
5.22 Lossless Join Dependency .....	136
5.23 Fifth Normal Form .....	136
5.24 Domain Key Normal Form .....	137
Normalization Project .....	138
Short Questions.....	142
Multiple Choice Questions.....	151
True/False Questions .....	154

---

Chapter 6: Database Design using E-R Model .....	156
6.1 Database Design using E-R Model.....	157
Short Questions .....	164
True/False Questions .....	165
<hr/>	
Chapter 7: Database Design with Semantic Object Model.....	166
7.1 Introduction .....	167
7.2 Mapping Simple Objects .....	167
7.3 Mapping Composite Objects .....	167
7.4 Converting 1:1 Compound Objects.....	168
7.5 Converting 1:N Compound Objects .....	169
7.6 Converting M:N Compound Objects .....	169
7.6 Mapping Hybrid Objects.....	170
7.6 Mapping Association Objects.....	170
7.6 Mapping Super/Subtype Objects .....	171
Short Questions .....	173
Multiple Choice Questions.....	174
True/False Questions .....	175
<hr/>	
Chapter 8: Structured Query Language .....	176
8.1 Structured Query Language.....	177
8.2 Basic SQL Statements .....	178
8.3 Operators in SQL .....	183
8.4 Functions .....	192
8.5 Joining.....	198
8.6 Sub-query .....	202
8.7 Correlated Subqueries .....	206
8.8 Data Definition & Modification .....	208
8.9 Constraints.....	210
8.10 Data Manipulation Language .....	213
8.11 Views .....	215
Short Questions .....	217
Multiple Choice Questions.....	225
True/False Questions .....	229
<hr/>	
Chapter 9: Concurrency & Security .....	231
9.1 Transaction .....	232
9.2 Concurrency.....	233
9.3 Resource Locking .....	235
9.4 Serializable Transaction Schedules.....	236
9.5 Deadlock .....	236
9.6 Database Failure.....	238
9.7 Database Recovery .....	238
9.8 Types of Backups .....	240
9.9 Database Security.....	241
Short Questions .....	243
Multiple Choice Questions.....	246

## VII

True/False Questions .....	248
<hr/>	
Chapter 10: Client-Server Databases & ODBC .....	250
10.1 Client-Server Architecture .....	251
10.2 Reliability and Security in Client-Server Systems .....	253
10.3 Open Database Connectivity (ODBC) .....	254
10.4 Conformance Levels .....	255
Short Questions .....	257
Multiple Choice Questions.....	259
True/False Questions .....	261
<hr/>	
Chapter 11: Distributed & Object Oriented Databases .....	262
11.1 Centralized Database System .....	264
11.2 Distributed Database System .....	264
11.3 Decentralized Database.....	265
11.4 Distributed DBMS .....	265
11.5 Distributed Database Design .....	267
11.6 Functions of a DDBMS .....	268
11.6 Client/Server Architecture .....	269
11.6 Types of DDBMS .....	271
11.6 DBMS Transparency & Gateways .....	271
11.6 Object Oriented Databases.....	272
11.6 Object Oriented Data Model .....	272
11.6 Object Oriented Database .....	273
11.6 Future Developments.....	276
Short Questions .....	277
Multiple Choice Questions.....	279
<hr/>	
Chapter 12: Introduction to MS Access .....	280
12.1 Microsoft Access .....	281
12.2 Starting MS Access.....	281
12.3 Access Application Window .....	281
12.4 Creating a Database .....	283
12.5 Opening an Closing Database .....	286
12.6 Exiting Access.....	287
<hr/>	
Chapter 13: Using Tables in MS Access .....	288
13.1 Table .....	289
13.2 Data Types in Access .....	289
13.3 Creating Table in Access .....	290
13.4 Tables Views.....	292
13.5 Entering data into Tables .....	293
13.6 Create a Table Using the Table Wizard.....	296
13.7 Field Properties .....	298
Practical 1 .....	301
Practical 2 .....	304

## VIII

13.8 Edit Records & Close Table .....	316
Practical 3 .....	320
<hr/>	
Chapter 14: Relationships in MS Access .....	328
14.1 Creating Relationship.....	329
14.2 Referential Integrity.....	331
Practical 4 .....	332
<hr/>	
Chapter 15: Sorting, Finding & Filtering Data .....	336
15.1 Sorting Records .....	337
15.2 Finding a Record.....	338
15.3 Filtering Records.....	340
Practical .....	341
<hr/>	
Chapter 16: Queries in MS Access .....	347
16.1 Queries .....	348
16.2 Creating a Query Using Simple Query Wizard .....	348
Practical 1 .....	348
16.3 Creating a Query in Design View .....	351
Practical 2 .....	351
16.4 Opening a Query.....	352
16.5 Wild Cards .....	353
Practical 3 .....	354
Practical 4 .....	358
16.6 Adding a Calculated Field to a Query .....	361
16.7 Using the Expression Builder.....	363
Practical 5 .....	365
16.8 Creating a Parameter Query.....	368
16.9 Creating a Query to Summarize Data.....	368
Practical 6 .....	369
Practical 7 .....	377
16.10 Action Query .....	382
Practical 8 .....	382
Practical 9 .....	385
Practical 10 .....	389
Practical 11 .....	391
<hr/>	
Chapter 17: Forms in MS Access .....	400
17.1 Forms .....	401
17.2 Using Forms to View Records .....	407
17.3 Creating Forms in Design View .....	408
17.4 Sub Forms .....	409
Practical .....	413
<hr/>	

## IX

Chapter 18: Reports in MS Access.....	417
18.1 Reports .....	418
18.2 Create a Label Report.....	424
Practical .....	427
<hr/>	
Chapter 19: Data Access Pages .....	431
19.1 Data Access Page .....	432
Practical 1 .....	432
19.2 Connection to the Data Source.....	438
Practical 2 .....	438
<hr/>	
Project: Magazine Database .....	445
<hr/>	
Project: Construction Company Database .....	456
<hr/>	
MS Access Exercise.....	467
<hr/>	