

Exam Code: 223702

Paper Code: 2278

Programme: Master of Science (Computer Science)

Semester - II

Course Title: Theory of Computation

Course Code: MCSL-2111

Time Allowed: 3 Hours

Max. Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section. The fifth question may be attempted from any section. Each question carries 14 marks.

(Section A)

- Q1) a) What do you mean by Chomsky Hierarchy? Discuss in detail.
 b) Explain pumping lemma for regular languages with an example.
- Q2) a) Make a regular expression for all the strings over $(0,1)$ that contain begins and ends with same symbol.
 b) What do you mean by linear grammar? Explain its types with suitable examples.

(Section B)

- Q3) a) How Mealy machine is converted into Moore machine? Explain with an example.
 b) What do you mean by transition diagram for DFA? How it is converted into transition table? Explain with suitable examples.
- Q4) Explain steps to convert Context Free Grammar into Greibach Normal Form with suitable examples.

(Section C)

- Q5) a) What do you mean by Context Sensitive Grammar? Explain its variations.
 b) Explain closure properties of Context Sensitive Grammar.
- Q6) Define Non-deterministic Push Down Automata. Also, make a PDA to accept $L = \{ww^R \mid w \in (0,1)^*\}$

(Section D)

- Q7) a) What do you mean by FIRST and FOLLOW? How these are computed? Explain with suitable example.
 b) Explain Recursive Language along with its properties.
- Q8) What is Turing machine? Explain with an example that describe all its tuples. What are various variations of Turing machine?

Exam Code: 223702
(20)

Paper Code: 2279

Programme: Master of Science (Computer Science)
Semester-II

Course Title: Image Processing

Course Code: MCSL-2112 ✓

Time Allowed: 3 Hours

Max Marks: 70

CANDIDATES ARE REQUIRED TO ATTEMPT FIVE QUESTIONS, SELECTING ATLEAST ONE QUESTION FROM EACH SECTION. THE FIFTH QUESTION MAY BE ATTEMPTED FROM ANY SECTION. EACH QUESTION CARRIES 14 MARKS.

SECTION A

1. EXPLAIN IMAGE PROCESSING. DISCUSS FUNDAMENTAL STEPS INVOLVED IN IMAGE PROCESSING.
2. WHAT ARE COMPONENTS OF DIGITAL IMAGE PROCESSING. DISCUSS IN DETAIL.

SECTION B

3. EXPLAIN HUMAN VISUAL SYSTEM MODEL OF IMAGE SIGNAL REPRESENTATION.

4. WRITE FIVE DATA FORMATS USED TO STORE IMAGES.

SECTION C

5. WHAT IS IMAGE DATA COMPRESSION. WHAT ARE VARIOUS TECHNIQUES USED, EXPLAIN ANY ONE IN DETAIL
6. WRITE NOTE ON
 - A) IMAGE ENHANCEMENT
 - B) IMAGE RESTORATION

SECTION D

7. EXPLAIN COLOUR IMAGE SIGNAL REPRESENTATION IN DETAIL.
8. EXPLAIN VARIOUS TECHNIQUES OF COLOUR IMAGE PROCESSING.

Exam Code: 223702

Paper Code: 2280

Programme: Master of Science (Computer Science)

Semester: II

Course Title: Advanced Programming Concepts

Course Code: MCSL-2113

Time Allowed: 3 Hours

Max Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section. The fifth question may be attempted from any section. Each question carries 14 marks.

Section – A

1. (a) Explain the features of java also Discuss 'Java is a pure Object oriented Language'. (9)
- (b) Discuss the structure of Java Program. (5)
2. (a) What are various control statements in java. Discuss. (6)
- (b) Write a short note on
 - i. Instanceof operator
 - ii. New operator
 - iii. Final variable
 - iv. Associativity in operators. (4 X 2 = 8)

Section – B

3. (a) Explain briefly about Stack Trace in Java. (5)
- (b) What is Exception handling? Discuss chained exception in Java with example. How is composition different from inheritance? (9)
4. (a) What is the need of Package in Java. Write the steps to create a package. How to manage Nested Package .How to access members of package. (10)
- (b) Discuss the concept of "super keyword". (4)

Section – C

5. (a) Discuss the role of Join() method . (7)
- (b) What is the difference between Method level synchronization and Block level synchronization? (7)
6. (a) What is Thread priority. How to assign priority to a thread. Explain with example. (7)
- (b) Discuss various attributes of <APPLET> tag. Write the procedure to pass parameter to applets. (7)

Section – D

7. (a) What is event handling. Explain the event delegation model. (5)
- (b) What is the use of event listener interfaces? (4)
- (c) What is the role of layout manager in Java Swing? (5)
8. Explain the basic hierarchy of JFrame class in Java. How do you set the dimensions of a JFrame .How do you handle events in a JFrame. What is the role of the ContentPane in a JFrame and how can it be used. How to handle exceptions in JFrame. (14)

Exam Code: 223702

Paper Code: 2281

Programme: Master of Science (Computer Science)

Semester: II

Course Title: Cloud Computing

Course Code: MCSL-2114

Time Allowed: 3 Hours

Max Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section. The fifth question may be attempted from any section. Each question carries 14 marks.

Section – A

- Q1 What do you understand by the term Cloud computing? Also write its characteristics and challenges. (14)
- Q2 Explain Virtualization. Also explain its various types. (14)

Section – B

- Q3 Explain each service model of Cloud computing in detail. (14)
- Q4: Explain Private, Public and Hybrid clouds with examples. (14)

Section – C

- Q5: What do you mean by Map-Reduce Programming? Explain its various concepts. (14)
- Q6: How can you achieve security in cloud? Explain infrastructure and data securities in cloud. (14)

Section - D

- Q7 What do you mean by Big data? Explain applications of Big data analytics in detail. (14)
- Q8 Write note on the following: (4*3.5=14)
- a) Federated cloud computing
 - b) Green cloud computing
 - c) Community Cloud
 - d) Cloud service provider

Exam Code: 223702

Paper Code: 2282

Programme: Master of Science (Computer Science)

Semester - II

Course Title: Distributed Database Systems

Course Code: MCSL-2115

Time Allowed: 3 Hours

Max. Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section. Fifth question may be attempted from any section. Each question carries 14 marks.

SECTION A

- Q.1. What are Distributed Database Systems? Explain Reference Architecture of distributed database systems.
- Q.2. What is Fragmentation? Explain the methods of fragmenting a relation.

SECTION B

- Q.3. How can you represent database operation in the form of query?
- Q.4. Explain the following:
- (i) Aggregate Functions (ii) Parametric Queries

SECTION C

- Q.5. What are profiles? Explain the estimation of profiles of algebraic operations.
- Q.6. What are different types of Failures in distributed systems? Explain how to overcome these failures.

SECTION D

- Q.7. What are deadlocks? Explain the detection and prevention methods.
- Q.8. Compare and contrast Concurrency control mechanism in distributed and centralized systems.

Exam Code: 223704

Paper Code: 4262

Programme: Master of Science (Computer Science)

Semester-IV

Course Title: Advanced Software Engineering

Course Code: MCSL-4111 ✓

Time: 3 Hours

Theory: 80

Note: Attempt five questions in all, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 16 marks.

SECTION- A

- Q1. What are the primary goals of the Capability Maturity Model (CMM), and how does it help organizations improve their processes? 16
- Q2. What are software quality assurance metrics, and why are they important in the software development process? 16

SECTION- B

- Q3. What is the purpose of a Risk Mitigation, Monitoring, and Management (RMMM) plan in software development? 16
- Q4. What is software risk management, and why is it important in the software development process? 16

SECTION- C

- Q5. What is the Unified Modelling Language (UML), and why is it used in software development? 16
- Q6. What is an interface in the context of software development, & why is it important? 16

SECTION- D

- Q7. Describe the components of a use case diagram in UML, including actors, use cases, relationships, and system boundaries. 16
- Q8. What are interaction diagrams in UML, and how do they differ from use case diagram? 16

Exam Code: 223704
(20)

Paper Code: 4263

Programme: Master of Science (Computer Science)
Semester-IV

Course Title: Microprocessor and its Applications

Course Code: MCSL-4112 ✓

Time Allowed: 3 Hours

Max Marks: 80

Note: Attempt five questions, selecting at least one question from each section. Fifth question can be attempted from any section. All question carry equal 16 marks.

SECTION- A

1. What is a microcomputer explain the block diagram of a microcomputer and explain its various components?
(16)
2. (a) Explain bus architecture of microprocessor in detail?
(08)
(b) Explain factors of performance metrics of microprocessor?
(08)

SECTION- B

3. Draw and explain pin configuration of 8086/8088 microprocessor in detail?
(16)

4. What is System clock? Explain the internal architecture of 8284 clock generator? (16)

SECTION- C

5. (a) How address space and data is organized for 8086/8088 microprocessor? (08)
(b) What are the major memory control signal for 8086 memory interfacing? Describe their role. (08)
6. (a) Draw and explain memory read cycle in minimum mode with timing diagram (08)
(b) Draw and explain memory write cycle in maximum mode with timing diagram (08)

SECTION- D

7. Explain the block diagram of 8255 PPI? (16)
8. Discuss the different type of interrupt and need of IVT in detail? (16)

Exam Code: 223704

Paper Code: 4264

Programme: Master of Science (Computer Science) Semester-IV

Course Code: MCSL-4113

Course Title: Foundation of Statistical Computing

Time Allowed: 3 Hours

Max Marks: 80

Note: Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 16 marks.

Section – A

1. Explain the concept of Computational Problem Solving. 16
2. Explain subletting in R with examples. 16

Section – B

3. What is a Data Frame? Explain various operations that can be applied on Data Frames. 16
4. Explain R operators in detail with programming examples. 16

Section – C

5. Write a program in R to check given number is prime. 16
6. Explain various Decision Making, looping and control statements in R. 16

Section – D

7. Explain Naïve Based model and K means model for predictive analysis. 16
8. Explain various graphs packages with example of drawing various graphs. 16