

Exam Code: 226701
(30)

Paper Code: 2281

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

Course Title: Theory of Computation

Course Code: MCSL-2111

Time Allowed: 3 Hours

Max Marks: 80

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

Section A

1. a) Explain Linear Grammar and its types with example
b) Explain closure properties of regular grammar in detail. 2x8=16
2. a) Make a regular expression for all the strings over (a,b) that contain atleast two b's.
b) With the help of pumping lemma show that language $L = \{a^n b^n \mid n > 0\}$ is not regular. 2x8=16

Section B

3. a) How regular expression is converted into ϵ -NFA? Explain with an example
b) Convert the following Context Sensitive Grammar into Chomsky Normal Form

$$S \rightarrow aSa | bSb | aA$$

$$A \rightarrow aA | bB | B$$

$$B \rightarrow bB | b | \epsilon \quad 2 \times 8 = 16$$

4. a) Explain with an example how Moore machine is converted into Mealy machine.
 b) What do you mean by parse tree? Explain with an example. How parse tree is helpful in deciding whether a grammar is ambiguous or not? $2 \times 8 = 16$

Section C

5. Define Non-deterministic Push Down Automata. Make a PDA to accept $L = \{a^n b^{2n} \mid n > 0\}$ 16
 6. a) What do you mean by context sensitivity? Explain one sided normal form.
 b) Formulate a Context Free Grammar that accepts all the palindrome strings over (a,b). $2 \times 8 = 16$

Section D

7. Explain:-
 a) Turing Machine
 b) Recursive Enumerable Language along with its properties. $2 \times 8 = 16$
 8. a) Outline properties of LR(k) grammar.
 b) Explain Post Correspondence Problem with an example. $2 \times 8 = 16$

**Exam Code: 226701
(30)**

Paper Code: 2282

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

Course Title: Image Processing

Course Code: MCSL-2112

Time Allowed: 3 Hours

Max Marks: 80

Note: Attempt Five questions, selecting at least one question from each section. Fifth question may be attempted from any section. Each question carries 16 marks.

Section A

1. Explain the term Digital Image Representation. How one can classify the image? Discuss the fundamental steps involved in Image Processing.
2. What are different practical applications of Image Processing? Explain any two with details.

Section B

3.
 - a) Explain Human Visual System model. Describe its properties.
 - b) What is the imaging system specification required for the desired quality of a digital image.

4. a) Explain the process of Image Sampling and Quantization using different sensor arrangements.
b) Briefly explain different available Image Data Formats.

Section C

5. a) What are the different types of mean filters used for noise reduction with in a digital image? Explain.
b) Explain about image restoration using minimum mean square error filtering.
6. What do you understand by Image Data Compression? What are the various techniques used for this purpose? Explain any one in detail.

Section D

7. a) What do you understand by Color Image Processing? How one can classify the color models?
b) Explain the concept of Color Quantization using suitable algorithm used for it.
8. a) Explain the procedure of converting colors from HIS to RGB.
b) Explain the concept of Color Slicing.

Exam Code: 226702**Paper Code: 2283****Programme: Master of Science (Computer Science) Semester-II****Course Title: Advanced Programming Concepts****Course Code: MCSL-2113****Time Allowed: 3 Hours****Max Marks: 80**

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

Section-A

- Q1(a) Discuss the OOPs features in java (8)
 Q1(b) Explain all bitwise operators in java (8)
 Q2(a) Describe the applications of different loops in java. Also explain nested loop with example. (9)
 Q2(b) What is the role of JVM and bytecode in Java. (7)

Section-B

- Q3(a) What is the purpose of File class ? Discuss various constructors used for constructing File objects. (8)
 Q3(b) How does Java handle Exceptions. Explain Try-Catch structure in detail. (8)
 Q4(a) What is the importance of Inheritance . Discuss the scope of protected members in the inheritance hierarchy. (7)
 Q4(b) What is interface. How to define and implement interface in java. Can interfaces be extended. Justify (9)

Section-C

- Q5 What is Multithreading. How to create threads. Explain any one method with example. What is the difference between user thread and daemon thread. give advantages of Multithreading (16)
 Q6 Write down the steps in creating an Applet. Discuss the various stages in Applet Life cycle
 Write the procedure to convert an applet to application and vice-versa. What is the function of Repaint() method in applet. (16)

Section-D

- Q7(a) What is a layout manager and what are different types of layout managers available in Java Swing (6)
 Q7(b) What are various Container classes (4)
 Q7(c) How do you classify Swing Components (6)
 Q8(a) Discuss the working of Graphics, Controls, Color and Fonts with JFrame. (8)
 Q8(b) What are Event Classes in Java. What is the highest-level event class of the event-delegation model. describe the role of 'this' keyword in event handlers. (8)

Exam Code: 226701
(30)

Paper Code: 2284

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

Course Title: Cloud Computing

Course Code: MCSL-2114

Time Allowed: 3 Hours

Max Marks: 80

Note: There are eight questions in the question paper divided into four section A-D of 16 marks each. Attempt atleast one question from each section. The fifth question may be attempted from any section.

Section — A

1. a) Explain Cloud computing along with challenges. (8)
b) Write cloud computing reference model. (8)
2. Explain Virtualization technique in cloud computing. (16)
Also write hardware level virtualization in detail.

Section - B

3. Explain SaaS, PaaS and IaaS service models of Cloud computing in detail. (16)

4. Explain various deployment models in cloud computing. (16)

Section — C

5. What do you mean by Thread Programming? Explain its various concepts. (16)
6. Write importance of security in cloud. Explain identity and access management in cloud. (16)

Section - D

7. What do you mean by Big data analytics? Explain its types. (16)
8. Write note on the following (4*4=16)
- a) Market oriented cloud computing
 - b) Green cloud computing
 - c) SLA
 - d) Cloud service broker

Exam Code: 226701
(30)

Paper Code: 2285

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

Course Title: Distributed Database Systems

Course Code: MCSL-2115

Time Allowed: 3 Hours

Max Marks: 80

Note

Attempt FIVE questions, selecting at least ONE question from each section. Fifth question may be attempted from any section. Each question carries equal 16 marks.

SECTION A

1. What are Distributed Database Systems? Compare how these are different from the Centralized ones?
2. Explain in detail the Distribution Transparency and its various levels.

SECTION B

3. What do you mean by global query and fragment query? Explain the process of translating global query into fragment query.

4. Explain in detail Join operation and Union operation in queries.

SECTION C

5. What is Serializability in distributed system? How can you manage Serializability using Timestamps in distributed system?
6. What are optimization graphs? Explain how a relation is reduced using joins and semi joins?

SECTION D

7. What are distributed deadlocks? How can you detect and prevent deadlocks?
8. Discuss the problems that occur in authorization and protection due to distributed system.