| Hall Ticket Number : | | | | | | | | | | |
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**R-17**

**Code: 7G143**

II B.Tech. II Semester Supplementary Examinations December 2022

# Formal Languages and Automata Theory

(Computer Science and Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks )

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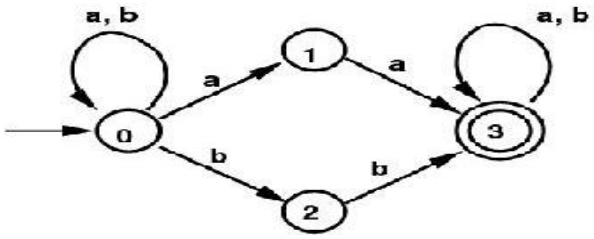
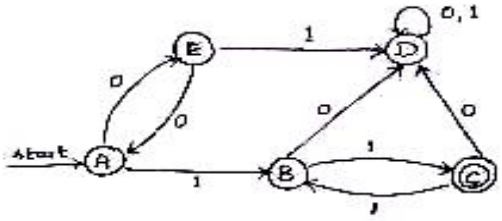
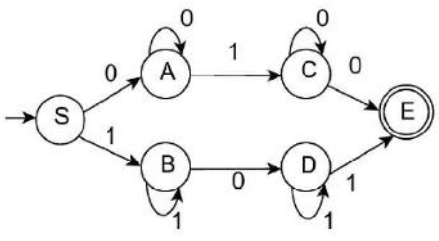
| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT–I** | | | |
| 1. | a) | Categorize the different types of languages in automata theory? | 4M | 1 | L4 |
| | b) | Let M be the NFA shown in Figure. Construct Equivalent DFA for the given NFA?   | 10M | 1 | L5 |
| | | **OR** | | | |
| 2. | a) | Construct a Moore machine to determine the residue mod 3 for each binary string treated as a binary integer. Convert the resultant to Mealy machine? | 10M | 1 | L5 |
| | b) | What are the difference between NFA and DFA? | 4M | 1 | L5 |
| | | **UNIT–II** | | | |
| 3. | a) | List and explain any six identity rules of the Regular expressions? | 6M | 2 | L1 |
| | b) | Convert the following automation to a Regular Expression?   | 8M | 2 | L4 |
| | | **OR** | | | |
| 4. | a) | What is pumping lemma? Write the applications of Pumping Lemma? | 4M | 2 | L1 |
| | b) | Construct NFA for the regular expression: 10+(0+11)0*1 | 10M | 2 | L5 |
| | | **UNIT–III** | | | |
| 5. | a) | Differentiate Leftmost Derivation and Rightmost Derivation with an example? | 4M | 3 | L5 |
| | b) | Find Right Linear Grammar for the following FA?   | 10M | 3 | L3 |
| | | **OR** | | | |

| | | | | | |
|---|---|---|---|---|---|
| 6. | a) | Give the CFG for "The set of all strings of balanced parenthesis"? | 6M | 3 | L3 |
| | b) | Convert the following grammar into CNF?<br>S → aAD<br>A → aB/bAB<br>B → b<br>D → d. | 8M | 3 | L6 |

**UNIT–IV**

| | | | | | |
|---|---|---|---|---|---|
| 7. | a) | Write a short note on DPDA and DCFL? | 4M | 4 | L3 |
| | b) | Construct the equivalent PDA for the following CFG?<br>S → 0A<br>A → 0AB/1<br>B → 1 | 10M | 4 | L5 |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 8. | a) | Differentiate PDA by empty stack and final state by giving their definitions? | 4M | 4 | L5 |
| | b) | Construct a PDA that accepts the language L = {$ww^R$/w ∈ {a, b}}? | 10M | 4 | L5 |

**UNIT–V**

| | | | | | |
|---|---|---|---|---|---|
| 9. | a) | Explain church's hypothesis? | 4M | 5 | L2 |
| | b) | Explain with a neat diagram, the working of a Turing Machine model? | 10M | 5 | L2 |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 10. | a) | What is Undecidability? Explain about PCP and modified PCP? | 4M | 5 | L2 |
| | b) | Design a Turing machine which multiplies two integers? | 10M | 5 | L6 |

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**R-17**

**Code: 7G144**

II B.Tech. II Semester Supplementary Examinations December 2022

# Object Oriented Programming using JAVA

(Computer Science and Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks )

*********

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| | | **UNIT–I** | | | |
| 1. | | Explain different types of control statements available in Java with examples. | 14M | 1 | 2 |
| | | **OR** | | | |
| 2. | a) | List and explain the java buzz words. | 8M | 1 | 1,2 |
| | b) | Explain the importance of byte code in java programming | 6M | 1 | 2 |
| | | **UNIT–II** | | | |
| 3. | a) | Explain abstract classes with an example. Compare final and abstract modifiers | 7M | 2 | 3 |
| | b) | Illustrate the use of “this” keyword with an example. | 7M | 2 | 3 |
| | | **OR** | | | |
| 4. | | Explain the process of creating and accessing packages with suitable example programs. | 14M | 2 | 3 |
| | | **UNIT–III** | | | |
| 5. | a) | What is the difference between checked and unchecked exception? Write the code segments for each type. | 7M | 3 | 3 |
| | b) | Explain “throw” and “throws” keywords in Java | 7M | 3 | 2 |
| | | **OR** | | | |
| 6. | a) | Explain Thread life cycle. | 7M | 3 | 2 |
| | b) | Illustrate user defined exceptions with an example. | 7M | 3 | 3 |
| | | **UNIT–IV** | | | |
| 7. | a) | Write a generic method to exchange of two different elements in an array | 7M | 4 | 3 |
| | b) | Explain overriding methods in a Generic class | 7M | 4 | 2 |
| | | **OR** | | | |
| 8. | a) | How to add a bridge method in Generic class? Explain with an example. | 7M | 4 | 3 |
| | b) | With the help of an example program explain how we can return the values from a lambda expression. | 7M | 4 | 2 |
| | | **UNIT–V** | | | |
| 9. | a) | Differentiate ArrayList and LinkedList? Demonstrate LinkedList with a java program | 7M | 5 | 2 |
| | b) | Explain Enumeration interface with a java program | 7M | 5 | 3 |
| | | **OR** | | | |
| 10. | a) | Explain Queue interface. | 6M | 5 | 2 |
| | b) | What is the difference between Iterator and ListIterator? Demonstrate ListIterator with example program | 8M | 5 | 3 |

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**R-17**

**Code: 7G145**

II B.Tech. II Semester Supplementary Examinations December 2022

# Operating Systems

(Computer Science and Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks )

*********

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| | | **UNIT–I** | | | |
| 1. | a) | Define a Process? How many states a process has? Explain when a process changes the state with a state diagram. | 7M | CO1 | L2 |
| | b) | Explain the significance of each field in the Process Control Block. | 7M | CO1 | L2 |
| | | **OR** | | | |
| 2. | | Explain different process scheduling algorithms with a suitable example? Draw the Gantt chart for each scheduling and also calculate the average waiting time for each of the Scheduling algorithms? | 14M | CO1 | L2 |
| | | **UNIT–II** | | | |
| 3. | a) | What resources are used when a thread is created? How do they differ from those used when a process is created? | 7M | CO2 | |
| | b) | What are the differences between user-level threads and kernel-level threads? Under what circumstances is one type better than the other? | 7M | CO2 | L2 |
| | | **OR** | | | |
| 4. | a) | Define a Monitor? Explain Schematic View of a Monitor? | 7M | CO2 | L2 |
| | b) | Show that, if the wait () and signal () semaphore operations are not executed atomically, then mutual exclusion may be violated? | 7M | CO2 | L5 |
| | | **UNIT–III** | | | |
| 5. | a) | What are the necessary conditions for a Deadlock? Discuss? | 7M | CO3 | L2 |
| | b) | List and explain the methods for handling Deadlocks? | 7M | CO3 | L2 |
| | | **OR** | | | |
| 6. | a) | Why are segmentation and paging sometimes combined into one scheme? | 7M | CO3 | L4 |
| | b) | What is the purpose of paging the page tables? | 7M | CO3 | L2 |
| | | **UNIT–IV** | | | |
| 7. | a) | Explain the following concepts concerning files: i) File Attributes ii) File operations iii) File Structures iv) File Types. | 8M | CO4 | L1 |
| | b) | Explain the concept of file sharing? | 6M | CO4 | L2 |
| | | **OR** | | | |
| 8. | | What is RAID? Explain different RAID levels with a neat diagram? | 14M | CO4 | L2 |
| | | **UNIT–V** | | | |
| 9. | a) | What is an Interrupt? Discuss in detail the interrupt-driven I/O cycle. | 7M | CO5 | L2 |
| | b) | How can you transfer I/O requests to hardware operations? | 7M | CO5 | L4 |
| | | **OR** | | | |
| 10. | a) | Give a detailed note on Denial of Service? | 7M | CO5 | L2 |
| | b) | Explain the difference between protection and security? Describe the scheme of capability list to implement protection? | 7M | CO5 | L5 |

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**R-17**

**Code: 7GC42**

II B.Tech. II Semester Supplementary Examinations December 2022

# Probability & Statistics

(Common to CE, ME & CSE )

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks )

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| | | Marks | CO | BL |
|---|---|---|---|---|
| | **UNIT–I** | | | |
| 1. | If P( A ) =1/ 4 , P(B )= 1/ 3 and P(A∪B )=1/ 2 then find P( A/ B ), P( B/A ), P ( A ∩B′ ) and P ( A /B′ ). | 14M | 1 | L2 |
| | **OR** | | | |
| 2. | State and prove Baye's theorem | 14M | 1 | L2 |
| | **UNIT–II** | | | |
| 3. | Ten coins are throw simultaneously. Find the probability of getting at least (i) seven heads (ii) six heads | 14M | 2 | L1 |
| | **OR** | | | |
| 4. | If the probability of a bad reaction from a certain injection is 0.001, determine the chance that out of 2000 individuals more than two individuals will get a bad reaction. | 14M | 2 | L4 |
| | **UNIT–III** | | | |
| 5. | If we can assert with 95% that the maximum error is 0.05 and P is 0.2. Find the size of the sample. | 14M | 3 | L2 |
| | **OR** | | | |
| 6. | Find 95% confidence limits for the mean of a normality distributed population from which the following sample was taken 15,17,10,18,16,9,7,11,13,14. | 14M | 3 | L2 |
| | **UNIT–IV** | | | |
| 7. | A random sample of 10 boys had the following I.Qs: 70, 120, 110, 101, 88, 83, 95, 98, 107, and 100. Do these data support the assumption of population mean I.Q of 100? | 14M | 4 | L4 |
| | **OR** | | | |
| 8. | A random sample of 100 recorded deaths in a country showed an average life span of 71.8 years. Assuming a population standard deviation of 8.9 years, does this seem to indicate that the mean life span today is greater than 70 years? Use a 0.05 level of significance. | 14M | 4 | L4 |
| | **UNIT–V** | | | |
| 9. | The measurements of the output of two units have given the following results. Assuming that both samples have been obtained from the normal populations at 10% significant level, Test whether the two populations have the same variance | | | |

| | | | | | |
|---|---|---|---|---|---|
| Unit-A | 14.1 | 10.1 | 14.7 | 13.7 | 14.0 |
| Unit-B | 14.0 | 14.5 | 13.7 | 12.7 | 14.1 |

14M 4 L4

**OR**

10. 4 coins were tossed 160 times and the following results were obtained,

| No, of Heads | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Frequency | 17 | 52 | 54 | 31 | 6 |

Under the assumption that coins are unbiased, find the expected frequencies of 0,1,2,3,4 heads and test the goodness of fit for α=0.05 14M 4 L4

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**R-17**

**Code: 7G141**

II B.Tech. II Semester Supplementary Examinations December 2022

# Computer Organization

(Computer Science and Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks )

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**UNIT–I**

1. a) What do you understand by fixed point and floating point representation? 8M
   b) What is bus structure in computer organization? 6M

**OR**

2. a) Write Short Note on Computers components 7M
   b) Explain about sign magnitude and 2's complement approaches for representing the fixed point numbers. Explain why 2's complement approach is preferable 7M

**UNIT–II**

3. a) What is an arithmetic micro operation? Explain with examples 6M
   b) What is Register Transfer Language? Explain few RTL statements for branching from their actual functioning. 8M

**OR**

4. Write short notes on the following:
   a) Register transfer language
   b) Instruction formats
   c) Addressing modes 14M

**UNIT–III**

5. Differences between the micro programmed control and hardwired control with examples 14M

**OR**

6. a) Explain about control memory in a micro programmed control organization 7M
   b) What are micro-subroutines? Explain. 7M

**UNIT–IV**

7. a) Elaborate about Virtual Memory in detail? 7M
   b) Differentiate between Static RAM and Dynamic RAM? 7M

**OR**

8. a) With a neat diagram, explain the process of Floating-point multiplication? 7M
   b) Show the step-by-step multiplication process using the Booth algorithm when the following binary numbers are multiplied (+15) * (-13). Assume 5-bit registers that hold signed numbers and draw the flow chart for the corresponding example? 7M

**UNIT–V**

9. a) List and explain different asynchronous data transfer modes? 7M
   b) Draw and explain the flowchart of four segment instruction pipelining. 7M

**OR**

10. a) Explain the connection of I/O bus to input-output devices 7M
    b) What is an Arithmetic Pipeline? Explain the steps in arithmetic pipelining. 7M

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| Hall Ticket Number : | | | | | | | | | | |
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**R-17**

**Code: 7G142**

II B.Tech. II Semester Supplementary Examinations December 2022

# Design and Analysis of Algorithms

(Computer Science and Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks )

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| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT–I** | | | |
| 1. | a) | Write performance analysis of an algorithm | 7M | CO1 | L2 |
| | b) | Explain the differences between an algorithm and pseudocode | 7M | CO1 | L2 |
| | | **OR** | | | |
| 2. | a) | How to validate an algorithm. Explain | 7M | CO1 | L5 |
| | b) | How to design an algorithm. Explain | 7M | CO1 | L5 |
| | | **UNIT–II** | | | |
| 3. | a) | Explain the average case analysis of Quick sort in detail | 10M | CO2 | L2 |
| | b) | Write the best case analysis of quick sort | 4M | CO2 | L2 |
| | | **OR** | | | |
| 4. | a) | Explain the differences between divide and conquer and greedy method | 7M | CO2 | L2 |
| | b) | What are the applications of divide and conquer | 7M | CO2 | L4 |
| | | **UNIT–III** | | | |
| 5. | a) | Explain the features of dynamic programming | 7M | CO3 | L2 |
| | b) | Show the general procedure of dynamic programming | 7M | CO3 | L4 |
| | | **OR** | | | |
| 6. | a) | Write the general method of dynamic programming | 7M | CO3 | L2 |
| | b) | Explain in detail Matrix chain multiplication | 7M | CO3 | L2 |
| | | **UNIT–IV** | | | |
| 7. | a) | List the advantages of backtracking method | 7M | CO4 | L1 |
| | b) | Write the general method of back tracking | 7M | CO4 | L4 |
| | | **OR** | | | |
| 8. | | Write in detail Travelling sales person problem and discuss how to solve it by using branch and bound method | 14M | CO4 | L4 |
| | | **UNIT–V** | | | |
| 9. | a) | How are P and NP problems related | 7M | CO5 | L4 |
| | b) | Compare NP hard and NP Completeness | 7M | CO5 | L4 |
| | | **OR** | | | |
| 10. | a) | Briefly explain the classes NP hard and NP complete | 7M | CO5 | L2 |
| | b) | Explain the satisfiability problem | 7M | CO5 | L2 |

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