Hall Ticket Number :

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R-15

Code: **5G141**

II B.Tech. II Semester Regular & Supplementary Examinations May 2018

Computer Organization

(Computer Science and Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) List and explain different interconnection structures used in multiprocessors? 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

OR

2. a) Simplify the following Boolean function in both Sum-of products and product-of-sums form. F(A,B,C,D) =   (0,1,2,5,8,9,10) 7M
   b) Explain about various buses such as internal, external, I/O, system, address and data bus. 7M

UNIT–II

3. a) What is Register Transfer Language? Explain few RTL statements for branching from their actual functioning. 8M
   b) For the pattern X= (A+B)*(C+D), explain three-, two-, one- and zero-address instructions by giving the syntax. 6M

OR

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

UNIT–III

5. a) Explain why hardwired control unit is faster than micro programmed control unit. 7M
   b) What are micro-subroutines? Explain. 7M

OR

6. a) Explain micro instruction sequencing in detail. 7M
   b) What is a micro-operation? Explain the four different types of micro-operations 7M

UNIT–IV

7. a) Draw a flow chart which explains multiplication of two signed magnitude fixed point numbers. 7M
   b) Multiply 10101 and 10111 with the above procedure. 7M

OR

8.   What is Cache memory? Explain the different mapping techniques used in the usage of Cache memory. 14M

UNIT–V

9. a) What is an Input-Output processor? Explain the need for Input-Output processor 7M
   b) What is meant by pipelining? Explain 7M

OR

10. a) List and explain different asynchronous data transfer modes 7M
    b) What is DMA? What is the need for DMA? Explain the working of DMA. 7M

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II B.Tech. II Semester Regular & Supplementary Examinations May 2018
Design and Analysis of Algorithms
(Common to CSE & IT)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Define Time and Space Complexity of an algorithm. Explain how to express the complexity in asymptotic notations.   8M
   b) Explain Towers of Hanoi problem with the help of an example. Develop the pseudocode and discuss its time complexity.   6M

OR

2. a) Explain recursive functions algorithm analysis with an example.   6M
   b) Explain the method of determining the complexity of procedure by the step count approach. Illustrate with an example.   8M

UNIT–II

3. Explain quicksort algorithm with the help of an example. Give the analysis of quick sort algorithm.   14M

OR

4. Develop Pseudo code for Dijkstra's algorithm that finds the distances from a given vertex to all the other vertices of a graph represented by its weight matrix. Discuss its complexity.   14M

UNIT–III

5. Which is a more efficient way to determine the optimal number of multiplications in a matrix chain multiplication problem enumerating all the ways of parenthesizing the product and computing the number of multiplication for each or running MATRIX CHAIN ORDER? Find an optimal parenthesizing a matrix chain product whose sequence of dimensions are (5, 10, 3, 12, 5).   14M

OR

6. Explain all pair shortest path using dynamic programming with the help of an example. Write the algorithm for all pair shortest path.   14M

UNIT–IV

7. a) Define Explicit and Implicit constraint. Give examples for explicit and implicit constraints.   7M
   b) Give the solution space organization for the 4- queen problem   7M

OR

8. Solve the following instance of traveling sales person problem using LCBB and draw the corresponding solution state space tree.

	1	2	3	4	5
1		7	3	12	8
2	3		6	14	9
3	5	8		6	18
4	9	3	5		11
5	18	14	9	8	

14M

UNIT–V

9. a) Using an example prove that satisfiability of boolean formula in 3- Conjuctive normal form is NP-Complete.   8M
   b) What does Nondeterministic Algorithm mean? Differentiate between deterministic and nondeterministic algorithm in design and analysis of algorithm?   6M

OR

10. a) What is the relationship between P, NP, NPC classes? What do you understand by Polynomial time reducibility?   8M
    b) Explain COOK's Theorem.   6M

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II B.Tech. II Semester Regular & Supplementary Examinations May 2018
Database Management Systems
(Common to CSE & IT)

Max. Marks: 70 Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Identify the main components in a DBMS and explain what they do. 7M
   b) What are the advantages of DBMS? Explain. 7M

OR

2. a) Explain the advantages of using a query language instead of custom programs to process data. 7M
   b) What is data independence and how does a DBMS support it? 7M

UNIT–II

3. a) Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted. 6M
   b) Explain the following terms:
      i) Relationship instance ii) Composite attribute
      iii) Multivalued attribute iv) Derived attribute 8M

OR

4. a) Name the main steps in database design. What is the goal of each step? In which step is the E-R model mainly used? 8M
   b) Explain the distinctions among the terms primary key, candidate key, and superkey 6M

UNIT–III

5. a) What are views? Discuss the problems encountered in modifying database through views. 6M
   b) Consider the following relations:
      Student(snum: integer, sname: string, major: string, level: string, age: integer)
      Class(name: string, meets at: string, room: string, fid: integer)
      Enrolled(snum: integer, cname: string)
      Faculty(fid: integer, fname: string, deptid: integer)
      Enrolled has one record per student-class pair such that the student is enrolled in the class.
      Write the following queries in SQL.
      i. For each faculty member that has taught classes only in room R128, print the faculty member's name and the total number of classes she or he has taught.
      ii. Find the names of students enrolled in the maximum number of classes. 8M

OR

6. a) Explain the differences between Triggers and constraints. 5M
   b) Consider the following schema:
      Suppliers(sid: integer, sname: string, address: string)
      Parts(pid: integer, pname: string, color: string)
      Catalog(sid: integer, pid: integer, cost: real)
      The Catalog relation lists the prices charged for parts by Suppliers. Write the following queries in SQL:
      i. For each part, find the sname of the supplier who charges the most for that part.
      ii. Find the sids of suppliers who supply only red parts.
      iii. Find the sids of suppliers who supply a red part and a green part. 9M

UNIT–IV

7. a) Compare 3NF and BCNF with a suitable example. 7M
   b) What is dependency preserving for decomposition? Explain why it is important. 7M

OR

8. a) Explain why 4NF is more desirable than BCNF. 5M
   b) What is Normalization? Explain briefly 1NF, 2NF & 3NF with suitable examples. 9M

UNIT–V

9. a) Explain the distinctions between the terms Serial schedule and Serializable schedule. 7M
   b) Why does a DBMS interleave current transactions? 7M

OR

10. a) How is data organized in a tree-based index? When would you use a tree? 7M
    b) Why are tree-structured indexes good for searches? 7M

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R-15

II B.Tech. II Semester Regular & Supplementary Examinations May 2018
**Formal Languages and Automata Theory**
(Computer Science & Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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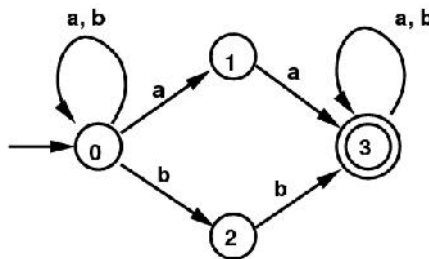
UNIT–I

1. a) Explain the properties of strings and languages.   6M
   b) For the NFA given by following state transition diagram
        a) Check whether the string abbabba is accepted or not
        b) Give at least two transition paths.
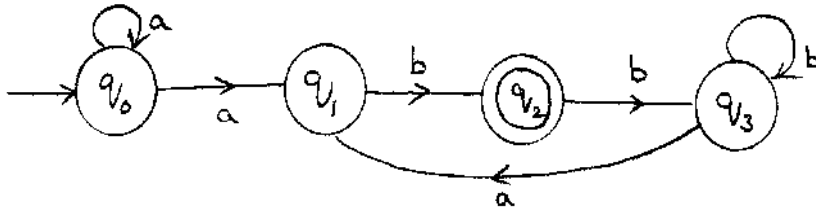
                                                                                                                         8M
OR

2. a) Let M be the NFA shown in Figure

        Construct Equivalent DFA for the above NFA

                                                                                                                         8M
   b) Explain Moore and Mealy machines formally with examples   6M

UNIT–II

3. a) Construct NFA for regular expression $(0+1)*00(0+1)*$ 8M
   b) Discuss Identity rules. Simplify the Regular Expression
        $+ 1*(011)*(1*(011)*)*$ 6M

OR

4. a) Show that $L = \{a^n b^n / n >= 1\}$ is not regular   7M
   b) Explain about the closure properties of regular sets   7M

UNIT–III

5. a) Construct finite automata recognizing the following regular grammar.
        A_0 aA_1
        A_1 $bA_1/bA_0/a$ 10M
   b) Mention any two applications of Context Free Grammar.   4M

OR

6. a) What is meant by ambiguous grammar? Test whether the grammar is ambiguous or not.

   $S \rightarrow A/B, A \rightarrow aAb/ab, B \rightarrow abB/\in$ 6M

   b) Convert the following grammar to CNF

   S $\rightarrow$ AB1/0

   A $\rightarrow$ 00A/B

   B $\rightarrow$ 1A1   8M

UNIT–IV

7. a) Define PDA mathematically. With a neat diagram explain the working of a PDA   6M

   b) Obtain a PDA to accept the language {L = a^nb^n / n $\geq$ 1}.   8M

OR

8. a) Construct the Context Free Grammar (CFG) for the following PDA.

   M=({q_0, q_1},{0,1},{X,z_0}, ,q_0,Z_0,) and where   is given by

   (q_0,0,z_0)={(q_0,XZ_0)}

   (q_0,0,X)={(q_0,XX)}

   (q_0,1,X)={(q_1,)}

   (q_1,1,X)={(q_1,)}

   (q_1, ,X)={(q_1,)}

   (q_1, , Z0)={(q_1,)}   8M

   b) Is NPDA (Nondeterministic PDA) and DPDA (deterministic PDA) equivalent? Illustrate with an example.   6M

UNIT–V

9. a) Define a Turing Machine. With a neat diagram explain the working of a Turing Machine.   4M

   b) Construct TM for the language L={$a^nb^nc^n$/n>=1}   10M

OR

10. a) Write short notes on Context Sensitive Language and Linear Bounded Automata.   6M

    b) Explain the Universal Turing machine in detail   8M

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Code: 5G144

II B.Tech. II Semester Regular & Supplementary Examinations May 2018

Object Oriented Programming

(Common to CSE & IT)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain clearly how the following terms are related to Java. i. Architecture-Neutral ii. Robust iii. High-performance iv. Dynamic   7M
    b) Explain the following Object Oriented concepts with suitable examples. i) Data Encapsulation ii) Method over loading   7M

OR

2. a) Explain constructors with an example. Illustrate one scenario where constructors are used?   7M
    b) Define a class? What is the general form of a class? How objects are declared explain with an example?   7M

UNIT–II

3. a) With an example explain the effect of using final keyword in inheritance.   7M
    b) Write a program to read two numbers in one class and do the arithmetic operations on these two numbers in another class, which is stored in another package.   7M

OR

4. a) Explain with suitable example, how super class variable can refer subclass objects? 7M
    b) "Interface variables are static and final by default in Java" - Support this statement with proper explanation   7M

UNIT–III

5. a) Differentiate multitasking with multi threading?   7M
    b) Discuss about nested try statements and how such a program may be executed?   7M

OR

6. a) What is multithreading? What are the priorities given for multithreading? Explain advantages of multithreading   7M
    b) Explain various categories of the compile time errors.   7M

UNIT–IV

7. a) Write an applet to calculate student grade   7M
    b) Write a short note on boarder layout with an example?   7M

OR

8. a) Explain about the parameter passing to applets.   7M
    b) Differentiate Applet with an application?   7M

UNIT–V

9. Define sockets. Use socket programming to design a client/server application that takes the password as input and checks whether it is correct. The program should print the appropriate message.   14M

OR

10. a) Explain the steps involved in creating JCheckBox and JRadioButton?   7M
    b) What are the methods supported MouseListener interface. Explain each of them with examples?   7M

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