Hall Ticket Number :

Code: 4G131

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017
Advanced Data Structures Through C++
(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 a class and a class member. Explain static class members with the help of an example. 8M
    b) Discuss friend functions in C++giving suitable example. 6M

OR

2. a) What is dynamic memory management? Write a C++ program demonstrating the usage of new and delete operators for a single variable as well as for an array. 6M
    b) Define a class Rectangle which has a length and a breadth. Define the constructors and the destructor and member functions to get the length and the breadth. Write a global function which creates an instance of the class Rectangle and computes the area using the member functions. 8M

UNIT–II

3. a) What's the difference between public, private, and protected? How can we protect derived classes from breaking when we change the internal parts of the base class? 7M
    b) What is Hybrid inheritance? Write a program to illustrate the concept of Hybrid Inheritance. 7M

OR

4. a) Write a C ++ program using stack ADT that reads an infix expression, converts the expression to postfix form and evaluates the postfix expression. 8M
    b) Explain the need for "Virtual Destructor". Can we have "Virtual Constructors"? 6M

UNIT–III

5. a) Define hashing, hash function and collision giving suitable examples. 7M
    b) Explain the different methods that are used to calculate hash functions. 7M

OR

6. a) Explain the linear probing method in Hashing? Also explain its performance analysis? 7M
    b) What is hashing with Chains? Explain? Compare this with Linear Probing? 7M

UNIT–IV

7. a) Write a method to find the height of a Binary Search Tree? 8M
    b) Explain the list representation of a tree by means of an example. 6M

OR

8. a) Explain different rotations in AVL Trees for insertion. 7M
    b) Explain insertion and deletion in a priority queue. 7M

UNIT–V

9. a) Define red-black tree. Find out the worst case time complexity if a new node is inserted in a red-black tree with n nodes (height of a red-black tree). 7M
    b) Define B-tree. Explain about insertion operation in a B-tree . 7M

OR

10. a) Discuss various types of pattern matching algorithms. 8M
    b) Explain how insertion and deletion operations is done on a Splay Tree. 6M

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Code: 4G132

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017
Digital Logic Design
(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) i. Perform the following division in binary: 1011111 divided by 101
        ii. Convert decimal 9126 to both BCD and ASCII codes. For ASCII, an odd parity bit to be appended at the left   7M

    b) i. Express the following function in sum of minterms and product of maxterms:
        ii. $f(w, x, y, z) = x'z + w'z + xz$ 7M

OR

2. a) Convert the following with indicated bases to decimal $(4310)_5$ and $(198)_{12}$ 4M

    b) Convert the following to other canonical form:
        (i) $F(A, B, C) = \Sigma(1,3,7)$ (ii) $F(x, y, z) = \pi(0,1,2,3,4,6,12)$ 10M

UNIT–II

3. a) Draw logic diagram for the following Boolean expression
        (i) $Y = A'B' + B(A + C)$ (ii) $Y = (A + B)(C' + D)$ 6M

    b) Simplify the Boolean switching function and obtain its realization using only NAND gates. $F(A, B, C, D) = \Sigma(0,1,3,4,,6,9,11) + \Sigma(2,5)$ 8M

OR

4. Explain about integrated circuits in detail.   14M

UNIT–III

5. a) Design a combinational circuit that converts a 4-bit gray code to a 4-bit binary number; Implement the circuit with exclusive-OR gates.   7M

    b) Design a code converter that converts a decimal digit from the 8, 4, 2 -1 code to BCD.   7M

OR

6. a) Draw the logic diagram of a 2-to-4 line decoder using NOR gates only. Include an enable input.   6M

    b) Implement function $f(A, B, C, D) = \Sigma(1, 3, 4, 11, 12, 13, 14, 15)$ with 8X1 MUX   8M

7. a) Write short notes on
   (i) Ripple counter
   (ii) Binary Ripple counter   8M

   b) Design a 4-bit binary synchronous counter with D flip-flops   6M

OR

8. a) Design a sequential circuit with two JK flip-flops A and B and two inputs E and x. If E=0, the circuit remains the same state regardless of the value of x, when E=1 and x=1 ,the circuit goes through the state transition from 00 to 01 to 10 to 11, and repeats. When E=1 and x=0, the circuit goes through the state transitions from 00 to 11 to 10 to 01 back to 00, and repeats.   10M

   b) Write the characteristic tables of
   (i) D flip-flop
   (ii) T flip-flop   4M

9. a) Design a combinational circuit using a ROM. The circuit accepts a 3-bit number and generates an output binary number equal to square of the input number   7M

   b) Implement the following two Boolean functions with a PLA:
   $$F1(A,B,C) = \Sigma(0,1,2,4)$$
   $$F2(A,B,C) = \Sigma(0,5,6,7)$$ 7M

OR

10. a) Compare asynchronous and synchronous sequential circuits   6M

    b) The Boolean functions for the inputs of an SR latch are
    $$S = x_1', x_2'x_3 + x_1x_{2x3}$$
    $$R = x_1x_2' + x_2x_3'$$
    Obtain the circuit diagram using a minimum number of NAND gates   8M

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II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017
Electrical Engineering and Electronics Engineering
(Common to ME, 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 about different types of electrical elements? 7M

    b) Deduce the equivalent resistance when R_1, R_2 and R_3 are connected in parallel. 7M

OR

2. Derive the necessary equations for converting star to delta and Delta to star 14M

UNIT–II

3. a) With a neat sketch explain the constructional details and principle of operation of DC generator 10M

    b) Write the applications of DC generators 4M

OR

4. a) Explain the working principle of DC motor with a neat diagram 7M

    b) Derive the expression for torque of DC motor 7M

UNIT–III

5. a) How the efficiency of single phase transformer can be find out from the OC and SC tests. 14M

OR

6. a) Sketch the slip torque characteristics of three phase induction motor and explain 7M

    b) Describe the procedure required to find out the efficiency of three phase induction motor by using a brake test. 7M

UNIT–IV

7. a) What is a PN junction diode and explain the V-I characteristics of PN junction diode 7M

    b) What is rectifier and explain the operation of single phase half wave diode rectifier with a neat output waveforms 7M

OR

8. a) Draw and explain the input and output characteristics of CE amplifier 7M

    b) How transistor can be acts as an amplifier 7M

UNIT–V

9. a) Explain about induction and dielectric heating and mention its industrial applications 14M

OR

10. a) Draw the block diagram of CRO and explain 7M

    b) Explain any two applications of CRO 7M

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