

Hall Ticket Number :

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**R-17**

**Code: 7G131**

II B.Tech. I Semester Regular & Supplementary Examinations November 2019

**Advanced Data Structures Through C++**

( 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) Define inline function. Write a C++ program for finding the area of a triangle using inline function. 5M
- b) What is an exception? Explain about throwing an exception. 9M

**OR**

2. a) Discuss I/O streams in detail. 7M
- b) Explain about new and delete operators with example programs. 7M

**UNIT-II**

3. a) Define constructors and destructors. Give the properties of constructors. 6M
- b) Differentiate between function overloading and function overriding. 8M

**OR**

4. a) Define Big-O notation and Theta notation? Give examples. 6M
- b) Write a C++ program to overload + operator to concatenate two strings. 8M

**UNIT-III**

5. a) Define a stack. List out any four applications of stacks. 4M
- b) Discuss about linked implementation of queue ADT. 10M

**OR**

6. a) Explain dictionary as an ADT. 6M
- b) How are insertions and deletions handled in a chained hash table? Explain. 8M

**UNIT-IV**

7. a) Explain in detail about binary tree traversal techniques. 4M
- b) Create max heap for the following elements 10M  
(28,16,14,103,52,105,139,27,160)

**OR**

8. a) What is a priority queue? Explain its applications. 4M
- b) Create an AVL tree with the following elements: 10M  
(12,22,54,19,11,84,63,17,15,4,13)

**UNIT-V**

9. a) Define B-trees and explain the operations on it. 4M
- b) Write an algorithm for insertion and deletion operations on B trees. 10M

**OR**

10. Explain an algorithm with an example for Brute-Force pattern matching, and write a C++ program. 14M

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**Code: 7G132**

II B.Tech. I Semester Regular &amp; Supplementary Examinations November 2019

**Database Management Systems**  
( 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) Describe about the three levels of data abstraction 7M  
b) List and explain about the main functionalities of a Database Administrator 7M

**OR**

2. a) With a neat diagram explain the Database System Structure 7M  
b) Explain the differences between File Systems and DBMS 7M

**UNIT-II**

3. a) Construct an ER diagram for a bank Database. Bank maintains data about customers, their loans, their deposits, lockers. Determine the entities and relationships 8M  
b) What is a weak entity set? Differentiate between entity set and strong entity set 6M

**OR**

4. a) Discuss various selection and projection set operations 7M  
b) What is meant by Relational Model? State and explain various types of integrity constraints with an example. 7M

**UNIT-III**

5. a) Write about Views? Explain the types of views with examples. 7M  
b) Briefly discuss and compare all relation set operators? 7M

**OR**

6. a) Illustrate about different types of joins with a suitable example. 7M  
b) Briefly discuss about aggregate functions? Explain about 'group by' and 'having' clauses. 7M

**UNIT-IV**

7. a) Explain second normal form with a suitable example. 7M  
b) Define normalization. Discuss the problems that may be caused by the redundancy with an example. 7M

**OR**

8. a) Define multivalued dependencies. Describe Fourth Normal form with an example. 7M  
b) Outline 3NF. List out the problems related to Decomposition? 7M

**UNIT-V**

9. a) Discuss about the implementation of atomicity and durability? 7M  
b) Explain in detail about ISAM? 7M

**OR**

10. a) Discuss about lock-based concurrency control. 7M  
b) Explain about transaction support in SQL. 7M

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<b>R-17</b>
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**Code: 7G133**

II B.Tech. I Semester Regular & Supplementary Examinations November 2019

**Digital Logic Design**

( 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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<b>UNIT-I</b>
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- 1. a) Convert  $(2AC5.D)_H$  to decimal, octal and binary. 7M
- b) Explain subtraction using r-1's complements with an example. 7M

**OR**

- 2. a) Express the following functions as a sum of min terms and as a product of max terms:  $F(A,B,C)=B^1C+A^1C+BC$  7M
- b) Reduce the following Boolean expressions to the indicated number of literals using Boolean theorems.
  - I.  $A^1C'+ABC +AC'$  to THREE literals
  - II.  $ABC^1D+A^1BD+ABCD$  to TWO literals
  - III.  $A^1B(D'+CD)+B(A+A^1CD)$  to ONE literal 7M

<b>UNIT-II</b>
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- 3. a) Draw the multiple-level NAND circuit for the following expression:  
 $F=w (x + y + z) + xyz$  7M
- b) Implement the following Boolean expression with exclusive-OR and AND gates:  $F = AB^1 C D^1+A^1BCD^1 + AB^1C^1 D +A^1 BC^1 D$  7M

**OR**

- 4. a) Simplify the following Boolean function together with the don't care conditions and simplify into SOP form  
 $F(A,B,C,D)= \sum m (4,5,6,7,12,13,14), d(A,B,C,D)= \sum m (1,9,11,15)$  7M
- b) Make a K-map for the function  $f (x,y,z,w) =xy +xz' +z +xw +xy'z +xyz$  and realize the minimized expression using NAND gates only 7M

<b>UNIT-III</b>
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- 5. a) Design a 4- bit ADDER/SUBTRACTOR circuit with add/sub control line. 6M
- b) Realize the function  $f(A,B,C,D) = \sum (1,2,3,4,6,7,8,10,12,14,15)$  using
  - i) 8:1 MUX
  - ii) 4:1 MUX 8M

**OR**

- 6. a) Design and draw a full subtractor which will use two half subtractors. 7M
- b) Define decoder. Construct 3x8 decoder using logic gates. 7M

UNIT-IV
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7. a) Convert a SR flip-flop to D type flip flop? 7M
- b) Explain with the help of neat diagram, the operation of 3-bit bidirectional shift register. 7M

## OR

8. a) Draw the circuit diagram of clocked D-flip flop with NAND gates and explain its operation using truth table 7M
- b) Explain with the help of neat diagram, the operation of 4-bit register with parallel load. 7M

UNIT-V
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9. a) Show that a BCD ripple counter can be constructed using a 4-bit binary ripple counter with asynchronous clear and a NAND gate that detects the occurrence of count 1010 6M
- b) Derive the PLA programming table for the combinational circuit that squares a 3-bit number 8M

## OR

10. a) Explain Ring counter operation and its applications using a diagram 7M
- b) Realize the following Boolean function using PROM 7M
- $F(x, y, z, w) = \sum m(0, 1, 3, 6, 8, 9, 15)$ .

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**R-17**

**Code: 7G134**

II B.Tech. I Semester Regular & Supplementary Examinations November 2019

**Discrete Mathematics**

( 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) Let p, q, and r be the propositions  
 p :You have the flu.  
 q :You miss the final examination.  
 r :You pass the course.

Express each of these propositions as an English sentence.

- (i)  $(p \rightarrow r) \vee (q \rightarrow r)$   
 (ii)  $(p \wedge q) \vee (\neg q \wedge r)$

7M

- b) Construct a truth table for  $(p \rightarrow q) \rightarrow (r \rightarrow s)$ .

7M

**OR**

2. a) Show that  $\neg(p \vee (\neg p \wedge q))$  and  $\neg p \wedge \neg q$  are logically equivalent by developing a series of logical equivalences. 7M  
 b) Prove that  $\sqrt{2}$  is irrational by giving proof by contradiction. 7M

**UNIT-II**

3. a) Let A, B, C be sets. Prove that  $A - (B \cup C) = (A - B) \cap (A - C)$  4M  
 b) Let  $A = \{1, 2, 3, 4\}$  and  $R = \{(1,2)(2,3)(3,3)(3,4)(4,2)\}$  be a relation defined on A. Find the reflexive closure, symmetric closure and transitive closure of R. 10M

**OR**

4. a) Suppose that the relations  $R_1$  and  $R_2$  on a set A are represented by the matrices  

$$MR_1 = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$
 and  $MR_2 = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \end{bmatrix}$   
 What are the matrices representing  $R_1 \cup R_2$  and  $R_1 \cap R_2$ ? 6M  
 b) Draw the Hasse diagram representing the partial ordering  $\{(a, b) \mid a \text{ divides } b\}$  on  $\{1, 2, 3, 4, 6, 8, 12\}$ . 8M

**UNIT-III**

5. a) Show that the set of all positive rational numbers forms an abelian group under the composition \* defined by  $a * b = (ab)/2$  7M  
 b) If  $(G, *)$  is a group and  $a \in G$  such that  $a * a = a$ , then show that  $a = e$ , where e is identity element in G. 7M

**OR**

6. a) How many three-digit numbers are there which are even and have no repeated digits? 4M

b) Determine the coefficient of the coefficient of  $x^3$  in  $(x_1 + x_2 + x_3 + x_4 + x_5)^{10}$  10M

**UNIT-IV**

7. a) Solve the recurrence relation  $a_n - 9a_{n-1} + 26a_{n-2} - 24a_{n-3} = 0$  for  $n \geq 3$ . 7M

b) Find the general expression for  $a_n$  in  $a_n - a^{n-1} + a^{n-2} = 0$  for  $n \geq 2$ . Using generating functions. 7M

**OR**

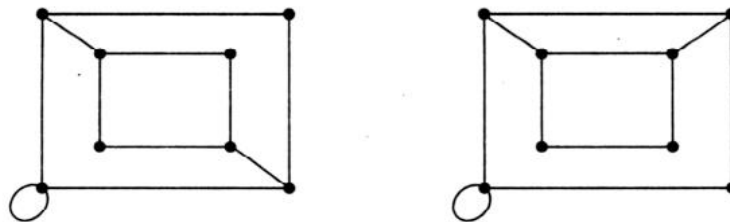
8. a) Solve  $a_n - 5a_{n-1} + 6a_{n-2} = 0$  where  $a_0 = 2$  and  $a_1 = 5$ . 6M

b) Find the general solution to the recurrence relation  $a_n - 5a_{n-1} + 6a_{n-2} = n(n-1)$  for  $n \geq 2$ . 8M

**UNIT-V**

9. a) What is the planar graph? Is  $K_{3,3}$  planar? Justify your answer 6M

b) Prove or disprove that the following two graphs are isomorphic?



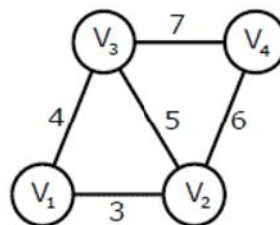
8M

**OR**

10. a) What is Chromatic number? Find the Chromatic number of the following graphs:

(i) Complete Graph ( $K_n$ ), (ii) Cyclic graph ( $C_n$ ), (iii) Complete bipartite graph  $K_{m,n}$ . 6M

b) Determine a minimum spanning tree for the following graph.



8M

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**Code: 7GC32**

II B.Tech. I Semester Regular & Supplementary Examinations November 2019

**Engineering Mathematics – III**  
( Common to All Branches )

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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<b>UNIT-I</b>
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- Find a root of the equation  $x^3 - 2x - 5 = 0$  by using Bisection method.
  - Find a root of the equation  $x \log_{10} x = 1.2$  by using Regula Falsi method.

**OR**

- Solve  $y' = x + y$  given  $y(1) = 0$ . Find  $y(1.1)$  and  $y(1.2)$  by Taylor's method.
  - Using Runge-Kutta method of order 4, find  $y(0.2)$  for the equation  $\frac{dy}{dx} = \frac{y-x}{y+x}, y(0) = 1$ .

<b>UNIT-II</b>
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- Find the cubic polynomial which takes the following values. Hence find  $f(4)$ .

x	0	1	2	3
y	1	2	1	10

- Use Lagrange's Interpolation formula to the following data to find the values of  $y$  when  $x = 10$ .

x	5	6	9	11
y	12	13	14	16

**OR**

- Apply Trapezoidal rule to evaluate  $\int_0^6 x \sec x dx$ .
  - Use Simpsons  $\frac{1}{3}$ <sup>rd</sup> rule to find  $\int_0^{0.6} e^{-x^2} dx$ .

<b>UNIT-III</b>
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- Fit a straight line of the form  $y = ax + b$  to the following data,

x	1	2	3	4	5	6	7	8
y	5.4	6.3	8.2	10.3	12.6	14.9	17.3	19.5

- Solve the Partial differential equation  $p^2 + q^2 = x + y$  by Charpit's method.

**OR**

- Fit the second degree parabola to the following data.

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

- Using method of separation of variables, Solve  $3 \frac{\partial u}{\partial x} + 2 \frac{\partial u}{\partial y} = 0, u(x, 0) = 4e^{-x}$ .

## UNIT-IV

7. a) Expand the function  $f(x) = x \sin x$  as Fourier series in the interval  $-f \leq x \leq f$ .

Deduce that  $\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \frac{1}{7.9} + \dots = \frac{1}{4}(f - 2)$ .

- b) Expand  $f(x) = \frac{x}{2}$  as a Fourier series in the interval  $-f < x < f$ .

OR

8. a) Express  $f(x) = x$  as a half range cosine series in  $0 < x < 2$ .

- b) If  $f(x) = \begin{cases} x, & 0 < x < f/2 \\ f - x, & f/2 < x < f \end{cases}$  then show that

$$f(x) = \frac{4}{f} \left[ \sin x - \frac{1}{3^2} \sin 3x + \frac{1}{5^2} \sin 5x + \dots \right].$$

## UNIT-V

9. a) Using Fourier integral representation, show that  $\int_0^{\infty} \frac{\check{S} \sin x \check{S}}{1 + \check{S}^2} d\check{S} = \frac{f}{2} e^{-x}$ , ( $x > 0$ ).

- b) Find the Fourier cosine transform of  $f(x) = \frac{1}{1+x^2}$ .

OR

10. a) Find the Fourier sine transform of  $xe^x$ .

- b) Find the finite Fourier sine and cosine transform of  $f(x) = 2x$ ,  $0 < x < 4$ .

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<b>R-17</b>
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**Code: 7G135**

II B.Tech. I Semester Regular & Supplementary Examinations November 2019

## **Web Programming**

( 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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<b>UNIT-I</b>
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1. a) List the new features in HTML5 comparing with earlier versions. 7M
- b) Write any Five Text Processing elements in HTML? 7M

**OR**

2. a) Why you need links in html? Explain the with an example to create a Link to different page 7M
- b) Differentiate HTML5 with other versions 7M

<b>UNIT-II</b>
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3. a) Write about IMG tag with attributes. How to insert video or audio using img element in web page. 7M
- b) Describe basic table element and attributes with example 7M

**OR**

4. a) Demonstrate how to Structure the Forms with <fieldset> and <legend> Elements. Give example 7M
- b) Create more Usable Form Fields with example 7M

<b>UNIT-III</b>
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5. a) Write about text pseudo-classes and styling text with example 7M
- b) Explain with an example illustrating the box model, links, backgrounds, list properties 7M

**OR**

6. a) Write the basic structure XML document. 7M
- b) What is DTD? Give DTD Elements and attributes with example 7M

<b>UNIT-IV</b>
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7. a) How to Add a Script to web Pages and comments in JavaScript 7M
- b) Explain how to create an External JavaScript with example 7M

**OR**

8. a) Demonstrate a user defines function with parameters 7M
- b) List the conditional statements, loops and events in javascript with example 7M

<b>UNIT-V</b>
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9. a) How to add jQuery to a web page 7M
- b) Explain how to manage events with jQuery in web page 7M

**OR**

10. a) Write about how to send a request to and response from server using ajax with example 7M
- b) What is DOM and explain about DOM elements and attributes with example 7M

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