Code: 5G131

II B.Tech. I Semester Supplementary Examinations February 2022

Advanced Data Structures Through C++

(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

UNIT–I

1. a) Explain the basic principles of object oriented programming   7M
   b) Define class? How the member functions can be defined with examples   7M

OR

2. a) Illustrate the significance of access specifiers in a class of C++?   7M
   b) How do you create a static member function? Explain with example   7M

UNIT–II

3. a) Differentiate between Constructor Overloading and Function Overloading   10M
   b) Discuss in detail about Polymorphism   4M

OR

4. What is template? Explain about function templates and class templates with suitable examples.   14M

UNIT–III

5. a) What are the uses of hash functions?   6M
   b) Distinguish between separate chaining and linear probing.   8M

OR

6. a) Define a Queue. List out any four applications of Queue.   4M
   b) Discuss about linked implementation of queue ADT.   10M

UNIT–IV

7. a) Define BST. Demonstrate its operations with suitable examples   7M
   b) Demonstrate Priority Queue using Heaps with examples   7M

OR

8. a) Explain external sorting on disk with example.   7M
   b) What is ascending priority queue? What are the applications of priority queue? 7M

UNIT–V

9. Write short notes on the following
   i. Standard Tries   ii. Compressed Tries   and   iii. Suffix Tries   14M

OR

10. a) Draw a B-Tree of degree 3 and explain.   4M
    b) Describe Boyer-Moore algorithm with an example.   10M

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R-15

Code: 5G431

II B.Tech. I Semester Supplementary Examinations February 2022
Discrete Mathematics
(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) Explain Free and Bound variables with examples. — 7M

   b) Verify the principle of duality for the following logical equivalence.
   $(P \lor Q) \land (\sim P \land (\sim P \land Q)) \Leftrightarrow (\sim P \land Q)$ — 7M

OR

2. a) What is Tautology? Prove that the following statement is tautology or not.
   $((P \to R) \land (Q \to R)) \to ((P \lor Q) \to R)$ — 7M

   b) Show that $(\sim P \land (\sim Q \land R)) \lor (Q \land R) \lor (P \land R) \Leftrightarrow R$ — 7M

UNIT–II

3. a) Explain partition and covering of a set. — 7M

   b) Let $X=\{1,2,3,4,5\}$ and $R=\{<x,y>|x>y\}$. Draw the graph of R and also its matrix. — 7M

OR

4. a) Let $X=\{1,2,3,4,5,6,7\}$ and Relation $R=\{(x,y)| (x-y)$ divisible by 3\}$ in X. Check Whether the relation R is Equivalence relation or not. — 8M

   b) Explain types of functions with examples. — 6M

UNIT–III

5. a) Explain Binomial and multinomial theorems. — 9M

   b) Prove by pigeonhole principle that in a group of 61 people, at least 6 people were born in the same month. — 5M

OR

6. a) State Principle of Inclusion-Exclusion with example. — 6M

   b) How many different license plates are there that involve 1,2 or 3 letters followed by 4 digits? — 8M

UNIT–IV

7. Solve the recurrence relation $2a_{n+3}=a_{n+2}+2a_{n+1}-a_n$ for $n>=0$ with $a_0=0$, $a_1=1$, $a_2=2$ — 14M

OR

8. a) Solve the recurrence relation $a_n = a_{n-1} + f(n)$, $n \geq 1$ by substitution. — 6M

   b) Solve the recurrence relation $a_n+a_{n-1}-8a_{n-2}-12a_{n-3}=0$, with $a_0=1, a_1=5, a_2=1$ for $n>=3$ — 8M

UNIT–V

9. a) What is BFS? Explain with an example. — 8M

   b) Define the following terms with examples.
   i) Euler circuit   ii) Hamiltonian cycle — 6M

OR

10. a) What is Four-coloring problem? Explain with an example — 7M

    b) What is bipartite graph? Explain with an example. — 7M

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