Hall Ticket Number :										

R-15

Code: 5G131

II B.Tech. I Semester Supplementary Examinations November 2019

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 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
   (28,16,14,103,52,105,139,27,160) 10M

OR

8. a) What is a priority queue? Explain its applications. 4M

   b) Create an AVL tree with the following elements:
   (12,22,54,19,11,84,63,17,15,4,13) 10M

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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Hall Ticket Number :										

R-15

Code: 5G432

II B.Tech. I Semester Supplementary Examinations November 2019

Digital Logic Design and Computer Organization

(Information Technology)

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) Which parts of the computers influences the performance of a computer system. Explain how while detailing the term “memory bus bottleneck”? 7M

   b) Convert the following decimal numbers to base indicated.

   i. 7163 to octal

   ii. 1762 to hex decimal 7M

OR

2. a) Distinguish between multiprocessor systems and multi computers? 7M

   b) How do you evaluate a computer’s performance? What are the various metrics that are used to represent a computer’s performance? 7M

UNIT–II

3. a) Outline different Combinational circuits present in the logic design process? 7M

   b) Convert the following into another canonical form F(A,B,C,D)= ∑(0,2,6,11,13,14) 7M

OR

4. a) Elaborate the process of designing a 3-bit binary Counter with an example? 7M

   b) Illustrate the design of a 4-bit shift register with example? 7M

UNIT–III

5. a) What is instruction? Explain basic machine instructions used in a computer? 7M

   b) Describe the general format of instructions with relevant examples. 7M

OR

6. a) Explain how division operation is performed on both fixed point and floating point number with an example? 7M

   b) Write an algorithm to add binary numbers represented in normalized floating point mode with base 2 for exponent. 7M

UNIT–IV

7. a) Define Memory? With a neat diagram explain memory hierarchy and explain the need of cache memory? 7M

   b) Elaborate about Virtual Memory in detail? 7M

OR

8. a) Explain the data transfer and manipulation instructions? 7M

   b) Differentiate between Static RAM and Dynamic RAM? 7M

UNIT–V

9. a) What are interrupts? How interrupts are commonly handled? Explain? 7M

   b) Examine how devices are addressed on the universal serial bus? 7M

OR

10. a) Explain the types of commands an I/O device receive when addressed by the CPU? 7M

    b) Explain about

    (i) UART

    (ii) PCI bus 7M

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Hall Ticket Number :										

R-15

Code: 5G431

II B.Tech. I Semester Supplementary Examinations November 2019

Discrete Mathematics

(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) 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 → ¬r) ∨ (q → ¬r)
   (ii) (p ∧ q) ∨ (¬q ∧ r) 7M

   b) Construct a truth table for (p ↔ q) ↔ (r ↔ s). 7M

OR

2. a) Show that ¬(p ∨ (¬p ∧ q)) and ¬p ∧¬q are logically equivalent by developing a series of logical equivalences. 7M

   b) Prove that √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

$$M_{R_1} = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} \text{ and } M_{R_2} = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \end{bmatrix}$$

   What are the matrices representing R1 ∪ R2 and R1 ∩ R2? 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 ∈ 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 $x_1^3 x_2^2 x_3^2 x_5^3$ in $(x1 + x2 + x3 + x4 + x5)^{10}$ 10M

UNIT–IV

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

b) Find the general expression for $a_n - 9a_{n-1} + 26a_{n-2} - 24a_{n-2} = 0$ for $n \geq 2$. Using generating functions. 7M

OR

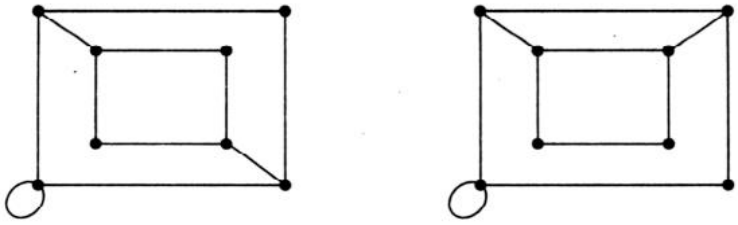
8. a) Solve $a_n - 5a_{n-1} + 6a_{n-2} = 0$ where $a_0 = 2$ and $a_1 = 5$. 6M

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

UNIT–V

9. a) What is the planar graph? Is K3,3 planar? Justify your answer 6M

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



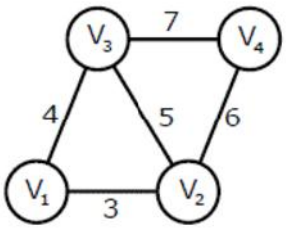
8M

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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Hall Ticket Number :										

R-15

Code: 5G236

II B.Tech. I Semester Supplementary Examinations November 2019

Electrical Engineering and Electronics Engineering

(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 the Ohm's Law and its applications. 7M

   b) State and explain Kirchoff's laws using neat diagrams. 7M

OR

2. a) Derive the expression for delta to star transformation. 7M

   b) Two resistances of 1.5 Ω and 3.5 Ω are connected in parallel and their combination is connected is series with a resistance of 1.95 Ω. Find the equivalent resistance of the circuit. What current will it draw if connected to a 30V supply? 7M

UNIT–II

3. a) A 6 pole, lap wound armature has 840 conductors and flux per pole of 0.018wb. Calculate the emf generated when the machine is running at 600rpm. 7M

   b) Explain the operation & principle of dc motors and explains the significance of back emf in dc motors. 7M

OR

4. Explain classification of a DC generator along with suitable diagrams and voltage and current relationship. 14M

UNIT–III

5. a) Derive the expression for E.M.F equation of a transformer. 7M

   b) Explain the principle operation of a three phase induction motor with relevant diagrams 7M

OR

6. a) Describe the tests that can be performed on a single phase transformer in detail. 7M

   b) A 3-Φ induction motor runs at 1200 rpm at no load and 1140 rpm at full load when supplied with power from a 60Hz, 3 phase line. Calculate number of poles and slip at full load. 7M

UNIT–IV

7. Explain the operation of Half wave rectifier with relevant diagrams. 14M

OR

8. a) Construct the practical circuit of a transistor and elaborate it. 7M

   b) Explain the operation of transistor as an amplifier. 7M

UNIT–V

9. Describe how phase and frequency are measured by using Lissajous figures. 14M

OR

10. Explain the Block diagram of CRO with a neat sketch. 14M

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Hall Ticket Number :										

R-15

Code: 5GC34

II B.Tech. I Semester Supplementary Examinations November 2019

Environmental Science

(Common to ECE & 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) Briefly explain the scope and importance of environmental studies. 7M

   b) Categorize the disciplines of environment. Illustrate the significance of each. 7M

OR

2. a) Enumerate the need of public awareness in environmental protection. 7M

   b) Discuss the importance of public participation and institutions responsibilities in environmental activities. 7M

UNIT–II

3. a) Distinguish between traditional and modern agriculture. 7M

   b) Define Flood and Drought. Explain the causes for floods and drought. 7M

OR

4. a) Compare renewable and Non renewable energy sources with examples. 7M

   b) Enumerate the role of individuals in conservation of natural resources. 7M

UNIT–III

5. a) Explain forest ecosystem with their functional components. 7M

   b) Illustrate Food chain, Food web and ecological pyramid with example. 7M

OR

6. a) Outline the functional units of any one aquatic ecosystem with their components. 7M

   b) Categorize different values of biodiversity 7M

UNIT–IV

7. a) Classify air pollutants. Discuss the effects of air pollution on plants and monuments. 7M

   b) Summarise the causes and control methods of soil pollution. 7M

OR

8. a) What are the major Marine pollutants? Discuss how to control marine pollution. 7M

   b) Define Stratification. Explain the effects of stratification on aquatic animals. 7M

UNIT–V

9. a) Justify the role of ethics in environmental protection. 7M

   b) Explain briefly causes, effects and control measures for global warming. 7M

OR

10. a) Justify the need of value education in environmental protection. 7M

    b) Explain human rights and responsibilities in relation to environment. 7M

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