II B.Tech. I Semester Supplementary Examinations May 2018
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)
****

UNIT–I

1. a) With the help of complete C++ programs explain the mechanism of Return-by-value and Return-by-reference of functions.   7M
   b) What is an Error and Exception? Explain the exception handling mechanism in C++?   7M

OR

2. a) Define "class" and "object". With an example, explain the concept of data encapsulation and accessing of member elements giving suitable examples.   6M
   b) When writing catch operator we can write directly type of exception as a type of its argument, pointer to a type of exception or reference to a type of exception. Compare these approaches.   8M

UNIT–II

3. a) What do you mean by run time polymorphism and how to implement run time polymorphism using virtual functions in C++?   7M
   b) What is template? Explain about function templates and class templates with suitable examples.   7M

OR

4. Explain in detail about Exception handling mechanism.   14M

UNIT–III

5. a) What is stack? Write the ADT implementation of stacks using templates in C++.   6M
   b) Develop a class for hash table using linear probing and neverUsed concept to handle an erase operation. Write complete C++ code for all the methods. Include a method to reorganize the table when (say) 60% of the empty buckets have never used equal to false. The reorganization should move pairs around as necessary and leave a properly configured hash table in which neverUsed is true for every empty bucket.   8M

OR

6. a) What is a dictionary? Define the abstract data type for it? Write the abstract class for the dictionary?   7M
   b) Give the applications of dictionary or dictionary with duplicates in which sequential access is desired.   7M

UNIT–IV

7. a) Write a method to delete the pair with the largest key from a Binary Search Tree.   6M
   b) Define a class called binarySearchTree to represent a Binary search tree. Extend this class by adding a public function outputInRange (Low,High) that outputs, in ascending order of key, all elements in a binary search tree whose key lies between Low and High. Use recursion and avoid entering sub trees that cannot possibly contain any elements with keys in desired range.   8M

OR

8. a) Draw the sequence of rotations required to perform a single right rotation and a double LR rotation in an AVL tree?   7M
   b) Explain how Priority Queue is Implemented Using Heaps.   7M

UNIT–V

9. a) Explain about the LLr, LRr, LLb, LRb imbalances in a Red-Black tree with example?   7M
   b) Does deleting a leaf node from a red-black tree then reinserting the same key always   7M

result in the original tree? Prove it does or given a counter example where it does not.

OR

10. a) What do you understand by the term "Trie"? Differentiate standard Tries and compressed Tries   8M

    b) Explain in detail about suffix tries with suitable examples.   6M

**

II B.Tech. I Semester Supplementary Examinations May 2018
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)

*****

UNIT–I

1. a) What is a bus? Briefly explain various types of buses used in modern computers.   8M
   b) Distinguish between multiprocessor systems and multi computers   6M

OR

2. a) Convert the following numbers into hexadecimal representation   9M
      (i) $10101100_{(2)}$ (ii) $76543_{(8)}$ (iii) $9458_{(10)}$
   b) Demonstrate n's complement and n-1's complement of a number   5M

UNIT–II

3. a) Minimize the following functions and realize using minimum number of gates.
      (i)   F1 = m[0,3,5,6,9,10,12,15]
      (ii)   F2 = m[0,1,2,3,11,12,14,15]   10M
   b) Why is NOR gate a universal gate?   4M

OR

4. Implement the following multi output combinational logic circuit using a 4-to-16 line decoder.
   F1 = [1,2,4,7,8,11,12,13]
   F2 = [2,3,9,11]   14M

UNIT–III

5. a) With the help of an example demonstrate division operation on floating point numbers.   6M
   b) List various logic operations and construct a circuit to perform these operations.   8M

OR

6. a) Differentiate between big endian and little endian assignments   4M
   b) What are the various addressing modes used by computer system? Explain them with example instructions.   10M

UNIT–IV

7. a) Formulate the control sequence for execution of the instruction ADD (R3), R1 on a processor with single bus organization of data path.   7M
   b) Describe micro instruction-sequencing organization.   7M

OR

8. a) Compile the organization of a 2M x 32 memory module using 512K x 8 static memory chips.   8M
   b) Illustrate the effect of associative-mapped technique for cache memory   6M

UNIT–V

9. a) How program controlled I/O is performed using polling?   7M
   b) Given that different devices are likely to require different interrupt-service routines, how can the processor obtain the starting address of the appropriate routine in each case?   7M

OR

10. a) Construct a general 8-bit parallel interface circuit.   8M
    b) Examine how devices are addressed on the universal serial bus.   6M

***

Code: 5G431

R-15

II B.Tech. I Semester Supplementary Examinations May 2018
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)

*****

UNIT–I

1. a) Show that RVS follow logically from premises
$C \vee D$, $(C \vee D) \rightarrow \sim H$, $\sim H \rightarrow (A \wedge \sim B)$, $(A \wedge \sim B) \rightarrow R \vee S$ 7M

   b) With reference to automatic theorem proving, show that SVR is tautologically implied by $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$ 7M

OR

2. a) Without truth table prove that $\sim Q \rightarrow (Q \rightarrow R) = Q \rightarrow (P \vee R)$ 6M

   b) Prove that $(x)[P(x) \rightarrow Q(x)], (x)[R(x) \rightarrow \sim Q(x)] \Rightarrow (x)[R(x) \rightarrow \sim P(x)]$ 8M

UNIT–II

3. a) Let $A = \{1, 2, 3, 4\}$ and $B = \{a, b, c\}$.
Let $R = \{(1, a), (1, b), (2, b), (2, c), (3, b), (4, a)\}$ and $S = \{(1, b), (2, c), (3, b), (4, b)\}$
Compute (i) complement of R (ii) $R \cup S$ (iii) $R \cap S$ (iv) R^{-1}.   7M

   b) Let $X = \{1, 2, 3, 4, 5, 6, 7\}$ and $R = \{(x, y) / x - y \text{ is divisible by } 3\}$. Show that R is an Equivalence relation. Draw the graph of R.   7M

OR

4. a) Write the properties of group   6M

   b) Draw the Hasse diagram of $(X, \leq)$, where X is the set of positive divisions of 45 and the relation R is such that R= {(x, y); x ∈ A, y ∈ A and (x divides y)}   8M

UNIT–III

5. a) In how many ways can a committee of 8 is to be formed from 10 women and 12 men, if the committee should contain
   (i) equal number of men and women.
   (ii) at least 3 women.   7M

   b) n couples are attending the party with the following assumptions
   i. A wife can attend the party without her husband
   ii. A husband cannot attend the party without his wife.
   How many different gatherings are possible in the party?   7M

OR

6. a) A bag contains 10 red marbles, 10 white marbles, and 10 blue marbles. What is the minimum no. of marbles you have to choose randomly from the bag to ensure that we get 4 marbles of same color?   7M

   b) A box contains 6 red, 8 green, 10 blue, 12 yellow and 15 white balls. What is the minimum no. of balls we have to choose randomly from the box to ensure that we get 9 balls of same color?   7M
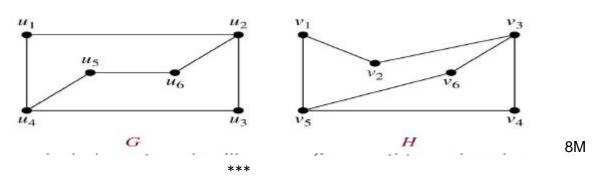
UNIT–IV

7. a) What is generating function, sequence, recurrence relation, formal power series with an examples? 6M

   b) Find a coefficient of x^{21} in the following expression: $(x^2 + x^3 + x^4 + x^5 + x^6)^8$ 8M

OR

8. a) Solve $a_n - 6a_{n-1} - 9a_{n-2}$ with $a_0 = 1$ and $a_1 = 6$ using recurrence relation. 6M

   b) Solve the recurrence relation: $2 S(k) - S(k-1) - 2 S(k-2) = 0$, $S(0) = 0$, $S(1) = 1$ 8M

UNIT–V

9. a) Define Euler graph, Eulerian path, Hamiltonian graph and Hamiltonian path. Give an example of a graph which is

   i. Eulerian but not Hamiltonian

   ii. Hamiltonian but not Eulerian

   iii. Both Eulerian and Hamiltonian

   iv. Non Eulerian and non Hamiltonian. 8M

   b) Define planar graph. Is the complete graph K4 planar? Prove that if G is a connected planar simple graph, then G has a vertex of degree not exceeding five. 6M

OR

10. a) Show that K 4, 4 is non planar? 6M

    b) Determine whether the graphs G and H are isomorphic? 8M

***

Code: 5G236

II B.Tech. I Semester Supplementary Examinations May 2018
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)
****

UNIT–I

1. a) State and explain the Kichhoff's laws   6M

   b) Three resistances 2 , 5 and 10 are connected in series across a supply voltage of 25 Volts. Calculate

      (i) Total current supplied (ii) Voltage across each resistor   8M

OR

2. a) Derive expression for equivalent capacitance when three capacitors of capacitances of C_1, C_2 and C_3 are connected in series   7M

   b) Three inductances 10 , 20 and 30 are connected in a delta connection. Find the equivalent star connection   7M

UNIT–II

3. a) Derive the EMF equation of DC generator   6M

   b) A 4 pole generator having 51 slots with each slot containing 20 conductors. The machine is driven at 1500 rpm and assuming the flux per pole to be 7.0mWb. What will be the voltage generated in machine when the armature winding is (i) Lap connected (ii) Wave connected.   8M

OR

4. a) What is meant by starter and explain the principle of operation of three point starter   7M

   b) What are the different types of speed control methods and explain any one of the speed control methods in detail   7M

UNIT–III

5. a) Explain the principle of operation of single phase transformer with a neat diagram   6M

   b) A 250KVA single phase transformer has iron losses of 1.8KW and full load copper losses is 200 watts. Calculate

      (i) Efficiency at full load at 0.8 p.f lagging

      (ii) Efficiency at half load at 0.8 p.f leading

      (iii) Maximum efficiency at 0.8 p.f lagging   8M

OR

6. a) Explain the principle of operation of alternator with a neat sketch   7M

   b) Draw and explain the slip-torque characteristics of three phase induction motor   7M

UNIT–IV

7. a) With a neat circuit diagram explain the principle of operation of full wave diode bridge rectifier along with its input and output waveforms   8M

   b) What is meant by rectifier and list it's applications   6M

OR

8. a) Explain the following

       (i) PNP transistor   (ii) NPN transistor   7M

   b) Draw the frequency response of CE amplifier and explain   7M

UNIT–V

9. Explain about different types of electric heating and mention its industrial applications   14M

OR

10. a) Draw and explain the principle of CRT   7M

   b) Explain the following

       (i) Voltage measurement of CRO

       (ii) Frequency measurement of CRO   7M

***

Code: 5GC34

II B.Tech. I Semester Supplementary Examinations May 2018
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)
****

UNIT–I

1. a) What is the need for studying Environmental issues?   7M

   b) what are two main causes of the Environmental crisis   7M

OR

2. a) Describe the important components of the Environment.   7M

   b) What is the role of public & institutions in protecting the Environment   7M

UNIT–II

3. a) With a help of case study explain the effects of extracting mineral resources   7M

   b) Express role of an individual in the conservation of natural resources.   7M

OR

4. a) Explain how almost every source of energy has its limits   7M

   b) Outline the importance of land as a natural resource. predict the serious effect
      of water logging and soil salinity   7M

UNIT–III

5. a) Explain the types and characteristic features of

      i) Grass land ecosystem **ii**) Aquatic ecosystem   7M

   b) Outline nutrient cycles **i**) bio geo chemical cycle **ii**) nitrogen cycle   7M

OR

6. a) Summarize the values of Biodiversity   7M

   b) How to conserve biodiversity?   7M

UNIT–IV

7. a) Explain the causes, sources and effects of marine pollution   7M

   b) Explain the causes, sources and effects of outdoor air pollution   7M

OR

8. a) Explain causes, effects and control measures of urban solid wastes.   7M

   b) What is thermal pollution? How is it controlled?   7M

UNIT–V

9. a) Explain the practice of rain water harvesting.   7M

   b) Write a note on i)wet land reclamation ii) Acid rain   7M

OR

10. a) Summarize the salient features of the wild life protection act?   7M

    b) Write a note on value based education in relation to environment.   7M

***

II B.Tech. I Semester Supplementary Examinations May 2018
Operating Systems and Linux Administration
(Information Technology)

Max. Marks: 70   Time: 3 Hours

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

****

UNIT–I

1. a) Explain the System Structure of Operating System   8M

    b) Describe the Operating-System Operations   6M

OR

2. a) What are the advantages and disadvantages of using the same system call
        interface for manipulating both files and devices?   10M

    b) Discuss about OS Generation   4M

UNIT–II

3. a) What is a Critical Section problem? Give the conditions that a solution to the
        critical section problem must satisfy.   8M

    b) Discuss about the issues to be considered with multithreaded programs   6M

OR

4. a) Distinguish between counting and binary semaphores. Show when does the
        semaphore definition requires busy waiting. Suggest a solution to overcome
        this problem.   7M

    b) Explain the Round Robin scheduling algorithm with a suitable example.   7M

UNIT–III

5. a) Discuss the procedure for handling the page fault in demand paging.   6M

    b) Explain differences between

        i) Logical and physical address.   Ii) Internal and external fragmentation.   8M

OR

6. a) Illustrate the page-replacement algorithms i) LRU ii) LRU-Approximation Page
        Replacement use the reference string 7, 0,1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2,1, 2, 0,
        1, 7, 0,1 for a memory with three frames.   8M

    b) Discuss the Hierarchical Paging structure.   6M

UNIT–IV

7. a) Explain in detail about various ways of accessing disk storage.   10M

    b) Explain single contiguous memory management technique with advantage
        and disadvantages.   4M

OR

8. a) Explain the various methods for free-space management.   10M

    b) Briefly explain the indexed allocation method.   4M

UNIT–V

9. a) Explain in detail about the system administration of LINUX system   7M

    b) Explain in detail about I/O in LINUX system.   7M

OR

10. a) Explain in detail about setting up a LINUX multifunction server.   7M

    b) Illustrate the procedure for setting XEN on LINUX host and adding guest OS.   7M

***