**Code: 1G131**

# Last Chance Special Supplementary Examinations
## II B.Tech. I Semester Supplementary Examinations July 2021
### Advanced Data Structures Through C++
( Information Technology )

Max. Marks: 70                                                          Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
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1.   What are constructor & destructor? Illustrate default and copy constructors with suitable examples

2.   Explain inheritance types in C++ with example

3.   What is ADT? Explain the implementation of Stack ADT in detail.

4.   a)  Define i) Hash Table  ii) Hash Function  iii) Bucket  iv) Home Bucket

     b)  Explain linear probing method of hashing with suitable example.

5.   a)  What is heap? Differentiate between min heap and max heap?

     b)  Discuss the model for external sorting

6.   Define Binary Search Tree? Explain about Binary Tree Traversal Technique with suitable example

7.   Describe about splay trees and the operations on them.

8.   a)  What is pattern matching? Explain in detail Boyer-Moore Algorithm by taking an example?

     b)  What are tries in data structure?

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## Last Chance Special Supplementary Examinations
II B.Tech. I Semester Supplementary Examinations July 2021
### Electronic Devices and Circuits
( Information Technology )

Max. Marks: 70                                                                 Time: 3 Hours
### Answer any five questions
### All Questions carry equal marks (14 Marks each)
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1. a) Draw the energy band diagram of PN junction diode under open circuit condition and explain.                                                                                7M
   b) Describe the following terms (i) insulator (ii) conductor (iii) semiconductor with an example.                                                                                7M

2. a) Develop Centre tapped full wave rectifier with its operation                       8M
   b) Write short notes on i) RC Filter ii) L Filter                                      6M

3. a) Infer the working principle of NPN transistor with neat diagram.                    7M
   b) Write short notes on i) DC Load line ii) Operating point                            7M

4. a) Write short notes on i) Thermal resistance ii) Heat sink.                           7M
   b) What are the advantages of self-bias over fixed bias?                               7M

5. a) With a neat sketch explain the characteristics of MOSFET in enhancement mode.       8M
   b) Explain the constructional details of JFET.                                         6M

6. a) Draw and explain class A power amplifier                                            7M
   b) Compare the class A and class B Power amplifiers                                     7M

7. a) How does negative voltage feedback increases B.W                                     7M
   b) Express the effect of feedback on i/p characteristics on current series.             7M

8. a) Explain with a circuit diagram the working of Hartley Oscillator                     8M
   b) show that colpitts oscillator circuit and discuss briefly                            6M

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## Last Chance Special Supplementary Examinations
II B.Tech. I Semester Supplementary Examinations July 2021
### Mathematical Foundations of Computer Science
( Information Technology )

Max. Marks: 70                                                    Time: 3 Hours

Answer any *five* questions
All Questions carry equal marks (**14 Marks** each)
*********

| | | | |
|---|---|---|---|
| 1. | a) | Define Tautology. Prove $[(P \to Q) \land (Q \to R)] \to (P \to R)$ is a tautology using truth table? | 6M |
| | b) | Obtain Principle Conjunctive Normal Form for the following formula.<br>P V ( P ( Q V ( Q R ) ) ) | 8M |
| 2. | a) | Write all the Rules of inference formulas with help of Examples. | 10M |
| | b) | Define Predicate Logic and Explain with help of examples. | 4M |
| 3. | a) | What are the different Properties of Binary Relations? | 6M |
| | b) | Define a Function and explain various types of Functions with neat Diagrams. | 8M |
| 4. | a) | Define group, monoids, semi groups and subgroups with examples. | 6M |
| | b) | Define homomorphism and explain homomorphism of semi groups. | 8M |
| 5. | a) | What is pigeonhole principle? Explain any two of its applications. | 6M |
| | b) | In how ways can the letters of the word 'ORANGE' be arranged so that the consonants occupy only the even positions? | 8M |

6.    Find a generating functions for the following sequences
      i)      1,1,0,1,1,………
      ii)     0,2,6,12,20,30,42,………    **14M**

7.    Define Minimal Spanning tree. Write Prim's algorithm to construct minimal spanning tree with example.    **14M**

8.    Define the following terms with suitable examples
      i)     Euler path
      ii)    Euler circuit
      iii)   Multi graph
      iv)   Hamiltonian cycle    **14M**

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**Code: 1G133**

II B.Tech. I Semester Supplementary Examinations August 2021

# Mathematical Foundations of Computer Science

( Common to CSE & IT )

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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1.  a) Write the following statements into symbolic form:
    i)   Mark is poor but happy.
    ii)  Mark is rich or unhappy.
    iii) Mark is neither rich nor happy.
    iv)  Mark is poor or he is both rich and unhappy.                                6M

    b) Define Tautology. Show that the following statement formula is a tautology by using
       truth table: **(P Q) ((P Q) (Q P))**                                           8M

2.  a) Explain Rules of inference.                                                   6M

    b) Determine whether the conclusion C flows logically from the premises $H_1$ and $H_2$ using
       truth table.
       **i)  $H_1$ : P   Q    $H_2$ :P        C: Q**
       **ii) $H_1$: ~P          $H_2$: P   Q    C: ~(P   Q)**                          8M

3.  a) Define the following with example:
    i)   Identity function
    ii)  One to one function
    iii) Onto fuction
    iv)  One to one correspondence.                                                  8M

    b) Define equivalence relation. Let X={1,2,3,4,5,6,7} and R={‹**x,y**›**/** x-y is divisible by 3}. Show
       that R is an equivalence relation and draw the graph of R.                    6M

4.  a) Define group, monoids, semi groups and subgroups with examples.              8M

    b) Define homomorphism and explain homomorphism of semi groups.                 6M

5.  a) Define permutation. Consider the three letters a, b, c. How many arrangements of the
       letter a, b, c taken two at a time?                                          6M

    b) Explain the principal of inclusion-exclusion                                 8M

6.  a) Define generating function. Find the generating function for the sequence 1,1,1,1………… 4M

    b) Find the sequences generated by the following functions
       i)  $2x^2(1-x)^{-1}$
       ii) $2x^3 + 1 / (1-x)$                                                        10M

7.  a) Define Minimal Spanning tree. Write Prim's algorithm to construct minimal spanning
       tree with example.                                                           10M

    b) Define planar graph with example.                                            7M

8.  a) Define the following terms with suitable examples
       i)   Euler path
       ii)  Euler circuit
       iii) Multi graph
       iv)  Hamiltonian cycle                                                       8M

    b) Write a short note on connected graphs with examples.                        6M

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