| Hall Ticket Number : | | | | | | | | | | |
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**R-15**

**Code: 5G131**

II B.Tech. I Semester Supplementary Examinations August 2021

# Advanced Data Structures Through C++

( Common to CSE & IT )

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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## UNIT–I

1. a) Define function? Explain about inline function with example 6M
   b) Describe the purpose of friend functions with suitable examples 8M

**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. What is function overloading? Explain in detail with examples 14M

**OR**

4. Define inheritance. Discuss types of inheritance with examples 14M

## UNIT–III

5. a) What are the advantages of stacks? 4M
   b) Illustrate an implementation of stack ADT in C++ with example. 10M

**OR**

6. a) Explain the different methods that are used to calculate hash functions? 7M
   b) How do you resolve collision explain any two collision resolving methods? 7M

## 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) What is an AVL Tree? Explain various steps for AVL search tree insertion with illustrations. 7M
   b) Write an algorithm for in-order traversal of a binary tree. Explain with an example 7M

## UNIT–V

9. Define splay tree. Give the algorithms for insertion and deletion operations on splay trees. 14M

**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 : | | | | | | | | | | |
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**R-15**

**Code: 5G431**

II B.Tech. I Semester Supplementary Examinations August 2021

# 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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| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT–I** | | | |
| 1. | a) | Define Compound Statement and explain all the connectives. | 10M | CO1 | L2 |
| | b) | Construct truth table for (P V Q ) V (P V ~ Q) | 4M | CO1 | L6 |
| | | **OR** | | | |
| 2. | a) | Define Normal Form and explain the different types of Normal Forms | 8M | CO1 | L2 |
| | b) | Obtain the PDNF for ~ P V Q | 6M | CO1 | L2 |
| | | **UNIT–II** | | | |
| 3. | | Define Relation What are the different types of relations with example | 14M | CO2 | L2 |
| | | **OR** | | | |
| 4. | a) | Draw the Hasse Diagram representing the positive divisors of 36 | 7M | CO2 | L4 |
| | b) | Let f and g be functions from R to R defined by f(x) = ax + b and g(x) = 1 – x + $x^2$ , if ( g o f ) (x) = $9x^2$ -9x + 3 , determine a , b. | 7M | CO2 | L2 |
| | | **UNIT–III** | | | |
| 5. | a) | Define Group and explain the properties of a group | 8M | CO3 | L2 |
| | b) | Show that every cyclic group of order n is isomorphic to the group $<z_n, t_n>$ | 6M | CO3 | L3 |
| | | **OR** | | | |
| 6. | a) | In How many ways can the 26 letters of the alphabet be permitted so that none of the patterns car , dog , pun or bytes occurs | 8M | CO3 | L3 |
| | b) | Explain the term Pigeonhole Principle. | 6M | CO3 | L2 |
| | | **UNIT–IV** | | | |
| 7. | a) | Find the sequences generated by the following functions: $( 1 + 3x)^{-1/3}$ | 8M | CO4 | L2 |
| | b) | Find the generating functions for the following sequences $1^2$ ,$2^2$, $3^3$ … | 6M | CO4 | L2 |
| | | **OR** | | | |
| 8. | a) | Solve the recurrence relation $3a_{n+1} – 4a_n = 0$ , $n \geq 0$ , $a_1=5$. | 8M | CO4 | L3 |
| | b) | Find the sequence generated by the following function.$(3+x)^3$ | 6M | CO4 | L3 |
| | | **UNIT–V** | | | |
| 9. | a) | Define the term Graph and Representation of a Graph. | 7M | CO5 | L2 |
| | b) | When it can be said that two graphs G1 and G2 are isomorphic | 7M | CO5 | L3 |
| | | **OR** | | | |
| 10. | | Define Spanning Tree and explain Kruskal's algorithm with example. | 14M | CO5 | L2 |

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| Hall Ticket Number : | | | | | | | | | | |
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**R-15**

**Code: 5G236**

II B.Tech. I Semester Supplementary Examinations August 2021

# Electrical Engineering and Electronics Engineering

( Common to CSE & IT )

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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## UNIT–I

1. a) Define the following i) Resistance ii) Inductance iii) Capacitance. Also give the V-I relationship for the above elements.

   b) Formulate the expression for equivalent inductance of two parallel connected inductors.

**OR**

2. State and explain Kirchoff's laws using neat diagrams.

## 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.

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

**OR**

4. a) Discuss the functions of following parts in a D.C Generator
   (i) Yoke (ii) Commutator (iii) Brushes.

   b) Explain briefly about Three point starter with a neat sketch.

## UNIT–III

5. a) A 250 KVA, single phase transformer has 98.135 % efficiency at full load and 0.8 lagging p.f. The efficiency at half load and 0.8 lagging p.f. is 97.751 %. Calculate the iron loss and full load copper loss.

   b) Explain brake test on three phase induction motor.

**OR**

6. Define the regulation of an alternator and explain how you will find the regulation by synchronous impedance method.

## UNIT–IV

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

**OR**

8. a) Explain the working of N-P-N transistor and mention its input-output characteristics.

   b) Explain in detail about frequency response of CE amplifier.

## UNIT–V

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

**OR**

10. Explain the principle & theory of dielectric heating with necessary diagrams and list out the industrial application of dielectric heating.

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| Hall Ticket Number : | | | | | | | | | | |
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**Code: 5GC33**

**R-15**

II B.Tech. I Semester Supplementary Examinations August 2021

# Probability & Statistics

( 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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**UNIT–I**

1. Box A contains 5 red and 3 white marbles and box B contains 2 red and 6 white marbles. If a marble is drawn from each box, what is the probability that they are both of same color? 14M

**OR**

2. Two cards are selected at random from 10each numbered 1 to 10.
Find the probability that the sum is even if
**i**) The two cards are drawn together
**ii**) The two cards are drawn one after other with replacement. 14M

**UNIT–II**

3. Out of 800 families with 5 children each, how many would you expect to have
(i) 3 boys (ii) 5 girls (iii) either 2 (or) 3 boys (iv) At least one boy.
Assume that there is equal probability for boys and girls. 14M

**OR**

4. The life of electronic tubes of a certain type may be assumed to be normal distribution with mean 155 hours and S.D. 19 hours. Determine the probability that the life of tube
(i) Between 136 hours to 174 hours
(ii) Less than 117 hours
(iii) More than 195 hours 14M

**UNIT–III**

5. a) Write the short note on Test of hypothesis. 7M

b) A manufacturer claimed that at least 95% of the equipment which he supplied to a factory conformed to specifications. An examination of a sample 200npieces of equipment revealed that 18 were faulty. Test his claim at 5% level of significance. 7M

**OR**

6. In a city A, 20% of a random sample of 900 school boys had a certain slight physical defect. In another city B, 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant at 0.05 level of significance. 14M

**UNIT–IV**

7. A random sample of 10 boys had the following I.Q's : 70, 120, 110, 101, 88, 83, 95, 98, 107 and 100.
(i) Do this data supports the assumption of a population mean I.Q of 100.
(ii) Find a reasonable range in which most of the mean I.Q. values of sample of 10 boys lie. 14M

**OR**

8. Two random samples have the following results.

| Sample | Size | Sample mean | Sum of square of deviations from the mean |
|---|---|---|---|
| 1 | 10 | 15 | 90 |
| 2 | 12 | 14 | 108 |

Test whether the samples came from the same normal population. 14M

**UNIT–V**

9. A sample analysis of examination results of 500 students was made. It was found that 220 students had failed, 170 had secured a third class, 90 were placed in second class and 20 got a first class. Do these figures commensurate with the general examination result which is in the ratio of 4:3:2:1 for the various categories respectively 14M

**OR**

10. The number of automobile accidents per week in a certain community are as follows 12, 8, 20, 2, 14, 10, 15, 6, 9, and 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period 14M

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| Hall Ticket Number : | | | | | | | | | | |
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**R-15**

**Code: 5G133**

II B.Tech. I Semester Supplementary Examinations August 2021

# Principles of Programming Languages

( 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) Explain in detail about various languages evaluation criteria and the characteristics that affect them. 7M
   b) What are the factors that influence the basic design of Programming languages? 7M

**OR**

2. a) Give BNF and EBNF versions of an expression grammar? 7M
   b) Explain denotational semantics and axiomatic semantics? 7M

## UNIT-II

3. a) Explain record, pointer and reference types with examples? 7M
   b) Explain about type checking, type compatibility, strong type? 7M

**OR**

4. a) Explain the design and implementation criteria used for record, union and array data types in programming languages. 7M
   b) Explain named constants and variable initialization with example. 7M

## UNIT-III

5. a) Explain in detail about guarded commands. 7M
   b) Distinguish between static scoping and Dynamic scoping with example? 7M

**OR**

6. a) What are design issues for selection structures? 7M
   b) Define Co-routines? Write the design issues of Subprograms? 7M

## UNIT-IV

7. a) Explain about Parameterized abstract data types with an example in C++? 7M
   b) Explain about generic sub programs. 7M

**OR**

8. a) Explain in detail about monitors and semaphores. 7M
   b) Discuss about exception handling in JAVA. 7M

## UNIT-V

9. a) Write about functions in ML and Haskell. 7M
   b) Give applications of Logic programming. 7M

**OR**

10. a) List the applications of functional programming languages. 7M
    b) Give comparison of Functional and Imperative Languages. 7M

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