Hall Ticket Number :										

R-15

Code: 5G131

II B.Tech. I Semester Supplementary Examinations March 2021

Advanced Data Structures Through C++

(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 the basic principles of object oriented programming
   b) Define class? How the member functions can be defined with examples

OR

2. a) Write about parameter passing methods in C++ with examples
   b) Demonstrate static class members with the help of an example.

UNIT–II

3. a) Define Constructor. Explain types of constructors with examples.

OR

4. a) What is abstract class?
   b) Write a C++ Program to implement the abstract class.

UNIT–III

5. a) Define a Queue. List out any four applications of Queue.
   b) Discuss about linked implementation of queue ADT.

OR

6. Define Hash Table? Discuss in detail about collision resolution technique?

UNIT–IV

7. a) What are the properties of Priority Queues?
   b) Demonstrate Binary Tree Traversal Techniques with algorithms.

OR

8. a) Define AVL Trees. Explain the ADT of AVL Tree.
   b) Create an AVL tree with the following elements:
   (12,22,54,19,11,84,63,17,15,4,13)

UNIT–V

9. a) Describe Boyer-Moore algorithm with an example.
   b) What is a Red-Black Tree? List its properties.

OR

10. Write short notes on the following
    Standard Tries ii. Compressed Tries and iii. Suffix Tries

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R-15

Code: 5G132

II B.Tech. I Semester Supplementary Examinations March 2021

Digital Logic Design

(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) Perform the following using 2's complement.
   i) 11010 – 1101 ii) 101011 – 100110 7M
   b) Obtain the truth table for the function F = XY + XY' + Y'Z 7M

OR

2. a) Convert the following numbers into decimals
   (i) $(B65F)_{16}$
   (ii) $(127.4)_8$
   (iii) $(4021.2)_5$
   (iv) $(1010110)_2$ 8M
   b) Expand A + BC'+ ABD'+ ABCD to MIN TERMS and MAX TERMS. 6M

UNIT–II

3. a) Implement Ex-OR gate using NOR gates. 7M
   b) Draw the multiple-level NAND circuit for the following expression:
   F= W (X + Y + Z) + XYZ 7M

OR

4. a) Show that the dual of the exclusive-OR is equal to its complement 7M
   b) Simplify the Boolean function using three variable map F(X, Y, Z) = ∑(0,1,5,7) 7M

UNIT–III

5. a) Define Decoder. Construct 3-to-8 Decoder using logic gates? 7M
   b) Implement a Full Adder with two 4 X 1 Multiplexers? 7M

OR

6. a) Explain about 3-bit Magnitude Comparator? 7M
   b) Design a Half-Subtractor with inputs x and y and outputs D and B. The circuit subtractor x-y and places the difference in D and the borrow in B? 7M

UNIT–IV

7. a) Convert a SR flip-flop to D type Flip-Flop? 7M
   b) Write difference between Combinational & Sequential circuits? 7M

OR

8. a) Explain with the help of neat diagram, the operation of 3-bit bidirectional shift register? 14M

UNIT–V

9. a) Draw and explain the operation of 4 bit ring counter? 7M
   b) What is ROM? List the different types of ROMs? 7M

OR

10. a) Draw and explain 4-bit Johnson counter using D-flip flop? 7M
    b) Implement the two Boolean functions with a PAL.
    F1(A,B,C) = ∑m (0,2,3,6), F2(A,B,C) = ∑m (1,2,5,6) 7M

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Hall Ticket Number :										

R-15

Code: 5G431

II B.Tech. I Semester Supplementary Examinations March 2021

Discrete Mathematics

(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) Define Statement and Explain various Connectives with Example.

   b) Construct truth table for the following formula

   (P^Q)V(~P^~Q)V(P^~Q)

OR

2. a) Write Converse, Inverse and Contrapositive of the following statements.

   i) ~P->~Q

   ii) P->~Q

   b) Prove that (P->Q)^(R->Q)<=>(PVR)->Q by using substitution method.

UNIT–II

3. State relation and explain properties of binary relations with examples.

OR

4. What is Hass diagram? Let X={2,3,6,12,24,36} and the relation ≤ on set X defined by x divides y then draw the Hass diagram.

UNIT–III

5. Define Group, monoid, semigroups and subgroups with examples.

OR

6. a) Explain pigeonhole principle with example.

   b) A certain question paper contains 2 parts A and B each containing 4 questions. How many different ways a student can answer 5 questions by selecting at least 2 questions from each part?

UNIT–IV

7. a) Find the generating function for the following sequence.

   i) $1^2,2^2,3^2,\ldots\ldots$ Ii) $1^3,2^3,3^3,\ldots$

   b) Find the coefficient of x^{20} in $(x^3+x^4+x^5+\ldots\ldots)^5$

OR

8. Solve the recurrence relation using generating function. $a_n - 9a_{n-1} + 20a_{n-2} = 0$, for $n \geq 2$ and $a_0 = -3$ and $a_1 = -10$.

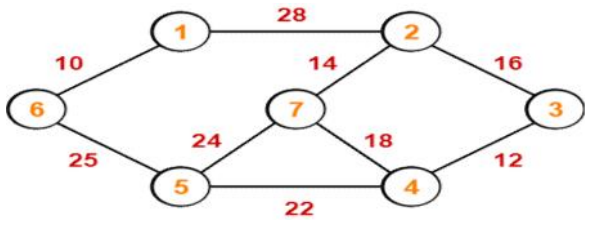
UNIT–V

9. a) Define a graph and explain various representations of graph with examples.

   b) Define Planner graph with examples.

OR

10. Explain kruskals algorithm? .Find Minimum cost spanning tree cost for the following graph.



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Hall Ticket Number :										

R-15

Code: 5GC33

II B.Tech. I Semester Supplementary Examinations March 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 (5 x 14 = 70 Marks)

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UNIT–I

1. Let X denote the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the (i) Discrete probability distribution (ii) Expectation (iii)Variance

OR

2. A card is drawn from a well shuffled pack of cards. What is the probability that it is either a spade or an ace?

UNIT–II

3. The marks obtained in statistics in a certain examination found to be normally distributed. If 15% of the students ≥ 60 marks, 40% of the students > 30 marks, find the mean and standard deviation

OR

4. For a normally distributed variate with mean 1 and standard deviation 3, find the probabilities that (i) $3.43 \le x \le 6.19$ (ii) $-1.43 \le x \le 6.19$

UNIT–III

5. A research worker wants to determine the average time it takes a mechanic to rotate the tires of a car and he wants to be able to assert with 95%. Confidence that the mean of his sample is of by at most 0.5 minutes. If he can presume from past experience that σ = 1.6 minutes how large a sample will have to take

OR

6. Find 95% confidence limit for the mean of a normality distributed population from which the following sample was taken 15, 17, 10, 18, 16, 9, 7, 11, 13, 14

UNIT–IV

7. A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population

OR

8. The standard deviation of two samples are 8 & 12, samples sizes are 200 and 100. Find the standard error of the difference between the means and also find the confidence interval at 5% level, Means of the samples are 60,50.

UNIT–V

9. The measurements of the output of two units have given the following results. Assuming that both samples have been obtained from the normal populations at 10% significant level, Test whether the two populations have the same variance

Unit-A	14.1	10.1	14.7	13.7	14.0
Unit-B	14.0	14.5	13.7	12.7	14.1

OR

10. A pair of dice are thrown 360 times and the frequency of each sum is indicated below:

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	8	24	35	37	44	65	51	42	26	14	14

Would you say that the dice are fair on the basis of the chi-square test at 0.05 level of significance?

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