

**Code: 5GC33**

II B.Tech. I Semester Supplementary Examinations March/April 2023

**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. a) Find the probability of getting a sum of 10 if we throw two dice 7M
- b) Find the continuous probability function  $f(x)=k x^2 e^{-x}$  when  $x \geq 0$  find (i) k (ii) mean (iii) variance 7M

**OR**

- 2. a) A card is drawn from a well shuffled pack of cards. What is the probability that it is either a spade or an ace? 7M
- b) A can hit a target 3 times in 5 shots, B hits target 2 times in 5 shots, C hits target 3 times in 4 shots. Find the probability of the target being hit when all of them try. 7M

**UNIT-II**

- 3. a) The mean and variance of a binomial variable X with parameters n and p are 16 and 8. Find  $P(x = 1)$  and  $P(x > 2)$  7M
- b) Six dice are thrown 729 times. How many times do you expect at least three dice to show a 5 or 6? 7M

**OR**

- 4. The marks obtained in statistics in a certain examination found to be normally distributed. If 15% of the students  $\leq 60$  marks, 40% of the students  $> 30$  marks, find the mean and standard deviation 14M

**UNIT-III**

- 5. a) The variance of population is 2. The size of the sample collected from the population is 169. What is the standard error of mean 7M
- b) The mean height of students in a college is 155cms and standard deviation is 15. What is the probability that the mean height of 36 students is less than 157cms 7M

**OR**

- 6. a) If we can assert with 95% that the maximum error is 0.05 and  $P = 0.2$  find the sample size 7M
- b) A sample of size 10 was taken from a population S.D of sample is 0.03. Find the maximum error with 99% confidence 7M

**UNIT-IV**

- 7. a) If 80 patients are treated with an antibiotic 59 got cured. Find a 99% confidence limits to the true population of cure 7M
- b) A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not up to the standard 7M

**OR**

- 8. A random sample of 10 boys had the following I.Q's 70, 120, 110, 101, 88, 83, 95, 98, 107, and 100. To this data support the assumption of a population mean I.Q of 100? Find a reasonable range in which most of the mean I.Q. values of samples of 10 boys lie 14M

**UNIT-V**

- 9. 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

**OR**

- 10. From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees

Soft Drinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Fanta	50	60	30

14M

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Hall Ticket Number :

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**R-15**

**Code: 5G131**

II B.Tech. I Semester Supplementary Examinations March / April 2023

**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) What are the static class members? Explain each in detail. 8M
- b) Explain about access control in C++. 6M

**OR**

2. a) Explain about classes with an example. 7M
- b) Explain about friend function and friend class in detail. 7M

**UNIT-II**

3. a) What is operator overloading and demonstrate operator overloading for Unary +. 7M
- b) Define Polymorphism. Write and explain about virtual functions. 7M

**OR**

4. a) Compare Time and Space complexity. Explain with suitable examples. 7M
- b) Demonstrate an abstract class with a suitable C++ program. 7M

**UNIT-III**

5. a) Demonstrate ADT implementation of Stack using C++ program. 8M
- b) Define Hashing. Explain about different hash functions. 6M

**OR**

6. a) Explain the operations performed on Linear list with suitable examples. 8M
- b) Compare Double Hashing and Extendable Hashing. 6M

**UNIT-IV**

7. a) Define BST. Demonstrate its operations with suitable examples. 7M
- b) Demonstrate Binary Tree Traversal Techniques with algorithms. 7M

**OR**

8. a) Demonstrate Priority Queue implementation using Heaps. 7M
- b) Define AVL Tree. Demonstrate its operations with suitable examples 7M

**UNIT-V**

9. a) Demonstrate insertion and deletion operations in B-Tree with example. 8M
- b) What is a Red-Black Tree? List its properties. 6M

**OR**

10. a) What is the role of Tries in pattern Matching? What are the different Tries? Explain Applications of Tries. 9M
- b) Create a Red-Black Tree by inserting the following sequence of numbers: 8, 18, 5, 15, 17, 25, 40 and 80. 5M

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**Code: 5G431**

II B.Tech. I Semester Supplementary Examinations March/April 2023

**Discrete Mathematics**  
(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**

- |  | Marks |
|--|-------|
| 1. a) Prove that $(P \rightarrow Q) \wedge (R \rightarrow Q) \leftrightarrow (P \vee R) \rightarrow Q$ by using substitution method. | 7M    |
| b) Explain Free and Bound variables with examples.   | 7M    |

**OR**

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|---|----|
| 2. a) Define rules of inference. And Show that $R \rightarrow S$ can be derived from the premises $P \rightarrow (Q \rightarrow S)$ , $\sim R \vee P$ and $R$ . | 8M |
| b) Write short notes on Quantifiers   | 6M |

**UNIT-II**

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| 3. State relation and explain properties of binary relations with examples. | 14M |
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**OR**

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| 4. a) 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. | 10M |
| b) What is lattice? Explain lattice properties.  | 4M  |

**UNIT-III**

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| 5. Define Group, monoid, semigroups and subgroups with examples. | 14M |
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**OR**

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| 6. a) Explain Binomial and multinomial theorems.  | 9M |
| b) Prove by pigeonhole principle that in a group of 61 people, at least 6 people were born in the same month. | 5M |

**UNIT-IV**

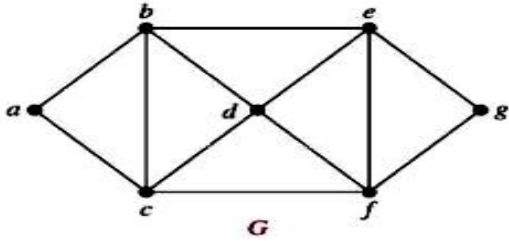
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| 7. a) Find a generating function for the recurrence relation $a_{n+1} - a_n = 3^n, n \geq 0, a_0 = 1$ . Find the general solution | 10M |
| b) Find the sequence generated by the following function. $(3+x)^3$   | 4M  |

**OR**

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| 8. Solve the recurrence relation $2a_{n+3} = a_{n+2} + 2a_{n+1} - a_n$ for $n \geq 0$ with $a_0 = 0, a_1 = 1, a_2 = 2$ | 14M |
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**UNIT-V**

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| 9. a) What is bipartite graph? Explain with an example.                       | 5M |
| b) Define Chromatic number. Find the chromatic number of the following graph. |    |



**OR**

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| 10. a) What is Hamiltonian graph? Explain with an example. | 8M |
| b) Explain the following terms with examples.              |    |
| i) Complete graph ii) Dual graph                           | 6M |

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