

Code: 5G431

II B.Tech. I Semester Supplementary Examinations May/ June 2022

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)

Marks

UNIT-I

1. 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

OR

2. 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 . 14M

UNIT-II

3. a) Let $A = \{1, 2, 3, 4, 6, 12\}$ and A defines the relation R aRb iff "**a divides b**". Prove that R is Partial Order on A . Draw the Hasse diagram. 10M
- b) Explain compatibility relation with examples. 4M

OR

4. a) Draw the Hasse diagram for the positive divisors for 36. 8M
- b) Let f and g be the two functions defined by $f(x) = 3x + 2, g(x) = 2x - 1$. Find i) $f \circ g^{-1}$ ii) $g \circ f$ 6M

UNIT-III

5. Let G be the set of all non-zero real numbers and let $a * b = 1/2ab$. Show that $\langle G, * \rangle$ is an abelian group. 14M

OR

6. Consider a set of integers from 1 to 250. Find how many of these numbers are divisible by 3 or 5 or 7. Also indicate how many are divisible by 3 or 7 but not by 5 and divisible by 3 or 5. 14M

UNIT-IV

7. 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 14M

OR

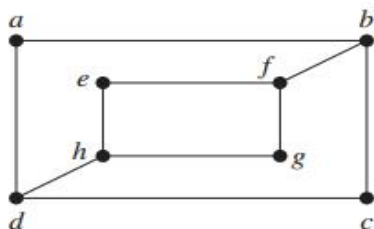
8. Solve the recurrence relation $a_n + 4a_{n-1} + 4a_{n-2} = 8, n \geq 2$, with $a_0 = 1, a_1 = 2$ 14M

UNIT-V

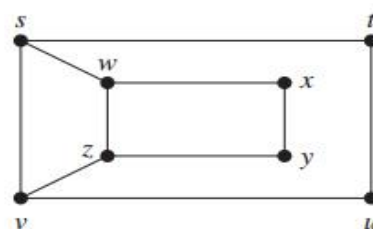
9. a) What is Hamiltonian graph? Explain with an example. 8M
- b) Explain the following terms with examples. 6M
- i) Complete graph ii) Dual graph

OR

10. Define Isomorphism. Verify the two graphs are isomorphic or not.



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14M

Code: 5GC33

II B.Tech. I Semester Supplementary Examinations May/June 2022

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)

UNIT-I

1. A consulting firm rents cars from three agencies, 20% from agency D, 20% from agency E and 60% from agency F. If 10% of the cars from D, 12% of the cars from E and 4% of the cars from F have bad tires, what is the probability that the firm will get a car with bad tires?

OR

2. A discrete random variable has probability distribution

x	1	2	3	4	5
p(x)	0.12	0.15	0.23	0.	0.2

Calculate a) Expected value b) Standard Deviation.

UNIT-II

3. Fit a Poisson distribution to the following data

x	0	1	2	3	4
f_i	122	60	15	2	1

OR

4. a) Find the mean and variance of a Normal distribution.
b) In a factory 2% of items are defective, by using Poisson distribution, find the probability of having more than 2 defective items in a sample of 100 item.

UNIT-III

5. Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favor of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same, at 5%.

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?

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.

OR

8. Fit a Poisson distribution to the following data and for its goodness of fit at level of significance 0.05.

x	0	1	2	3	4
Frequencies	419	352	154	56	19

UNIT-V

9. a) Explain the np- charts.
b) Show that the variance of queue is

$$V(n) = E(n^2) - [E(n)]^2$$

OR

10. Patients arrive at a clinic according to a poisson distribution at the rate of 30 patients per hour. The waiting room does not accommodate more the 14 patients. Examination time per patient is exponential with mean rate 20 per hour.

i) Find the effective arrival rate at the clinic.

ii) What is the probability that an arriving patient will not wait. Will he find a vacant seat in the room?

iii) What is the expected waiting time until a patient is discharged from the clinic.

Hall Ticket Number :																			
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R-15

Code: 5G131

II B.Tech. I Semester Supplementary Examinations May/June 2022

Advanced Data Structures through C++

(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)

Marks

UNIT-I

- 1. a) What is friend function in C++? List the advantages of friend function?
- b) Differentiate error and exceptions in C++ with examples?

OR

- 2. a) Explain the basic principles of object oriented programming
- b) Define class? How the member functions can be defined with examples

UNIT-II

- 3. Distinguish between operator and function overloading with an example programs.

OR

- 4. What do you mean by run time polymorphism and how to implement run time polymorphism using virtual function in C++

UNIT-III

- 5. a) How are insertions and deletions handled in a chained hash table? Explain.
- b) Compare Double Hashing and Extendable Hashing.

OR

- 6. a) Explain the operations performed on Linear list with suitable examples.
- b) Explain dictionary as an ADT.

UNIT-IV

- 7. a) Explain about external sorting and Multi way merge.
- b) Differentiate Binary Tree and Binary Search Trees

OR

- 8. a) Define and explain in detail about priority queue ADT
- b) Explain poly-phase merge sort with an example.

UNIT-V

- 9. a) What is B-Tree? Explain the properties of B-Tree ADT.
- b) Demonstrate insertion and deletion operations in B-Tree with example.

OR

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