

Code No.: CS305PC

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**CMR ENGINEERING COLLEGE: : HYDERABAD**  
**UGC AUTONOMOUS**

**II-B.TECH-I-Semester End Examinations (Supply) - February- 2024**

**DISCRETE MATHEMATICS**

**(Common to CSE, IT & CSM)**

[Time: 3 Hours]

[Max. Marks: 70]

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART-A**

**(20 Marks)**

1. a) Differentiate Tautology and Contradiction. [2M]
- b) Prove the Demorgan's law. [2M]
- c) Define Cartesian product. Give an example. [2M]
- d) Define Equivalence relation. [2M]
- e) How many words of three distinct letters can be formed from CAKE? [2M]
- f) Define Recursion. [2M]
- g) State Bayes theorem. [2M]
- h) Find the Generating function of the following series b,b,b,b,b,b. [2M]
- i) Define Bipartite graph. [2M]
- j) Distinguish between planar and non-planar graphs. [2M]

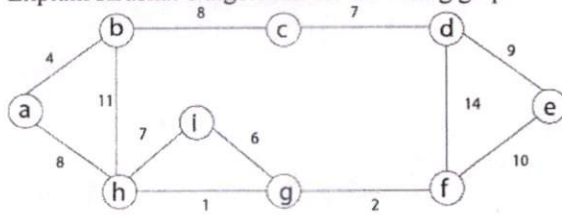
**PART-B**

**(50 Marks)**

2. a) Show that  $S \vee R$  is tautologically implied by  $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$  [5M]
  - b) Describe the basic connectives along with their truth tables. [5M]
- OR**
3. Obtain PCNF and PDNF by using truth table for the formula  $(P \rightarrow Q) \vee (Q \leftrightarrow R)$ . [10M]
4. a) Let  $f(x)=x+2$ ,  $g(x) = x-2$ ,  $h(x) = 3x$  find i) fog ii) goh. [5M]
  - b) Construct Hasse diagram for factors of 210. [5M]
- OR**
5. What is Equivalence relation? Prove that  $R=\{(1,1), (1,2), (2,1), (2,2), (3,3), (3,4), (4,3), (4,4), (5,5), (5,6), (6,5), (6,6)\}$  is Equivalence relation. [10M]
  6. Explain the concept of principles of mathematical induction using an example? [10M]
- OR**
7. Write a short notes on  
i. Complexity of algorithms  
ii. Growth of function [10M]
8. Explain briefly Inclusion – Exclusion and its Applications. [10M]
- OR**
9. Solve the recurrence relation  $a_n = a_{n-1} - n$  with the initial term  $a_0 = 4$ . [10M]

10. Explain Kruskal's algorithm for following graph

[10M]



OR

11. What do you mean by chromatic number? Find the chromatic number of the following graph:

[10M]

