Code No.: R22CS305PC   R22   H.T.No. [ ][ ][8][R][ ][ ][ ][ ]

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–I–Semester End Examinations (Regular) - February- 2024
DISCRETE MATHEMATICS
(Common for CSE, CSM)

[Time: 3 Hours]   [Max. Marks: 60]

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 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   (10 Marks)

1. a) Write the negation of the statement, "If the processor is fast then the printer is slow." [1M]
   b) Construct truth table for $P \wedge (P \vee Q)$. [1M]
   c) List the types of relations? [1M]
   d) Describe Transitive relation? [1M]
   e) Define a group. [1M]
   f) Define algebraic system with example. [1M]
   g) Define permutations and combinations? [1M]
   h) Find the coefficient of $x^3 y^7$ in the expansion of $(x+y)^{10}$. [1M]
   i) Define Hamiltonian circuit and Hamiltonian graph. [1M]
   j) What is Graph? [1M]

PART-B   (50 Marks)

2. Prove the tautology $[(p \rightarrow r) \wedge (q \rightarrow r)] \rightarrow [(p \vee q) \rightarrow r]$. [10M]

OR

3. a) Construct a truth table for the following compound statements [5M]
   i. $(p \rightarrow q) \wedge (7p \rightarrow q)$ ii. $p \rightarrow (7q \vee r)$ [5M]
   b) Write the negation of the following statements.
   i. Jan will take a job in industry or go to graduate school.
   ii. James will bicycle or run tomorrow.
   iii. If the processor is fast then the printer is slow.

4. Describe a bijective function. Explain with reasons whether the following functions [10M] are bijective or not.
   (i) $f(x) = 4x+2$, A = set of real numbers
   (ii)   (ii) $f(x) = 3+1/x$, A= set of non- zero real numbers
   Find also the inverse of each of the functions.

OR

5. What is an equivalence relation? prove that R={(1,1), (1,2), (2,1), (2,2), (3,3), (3,4) [10M] (4,3), (4,4), (5,5), (5,6), (6,5), (6,6)} is equivalence relation.

6. Show that set of all positive rational numbers forms an abelian group with respect to [10M] the composition a*b=ab/4

OR

7. Define hasse diagram? Draw the hasse diagram representing the positive divisor of [10M] 36.

8. List the types of permutations? Explain in detail about the enumeration of [10M] combinations and permutations.

OR

9. Discuss about the binomial and multinomial theorem. [10M]

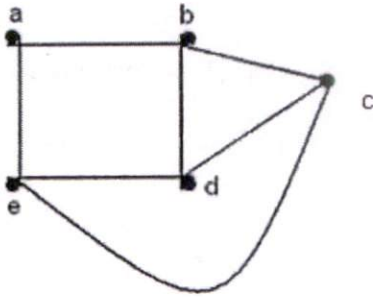10. Explain Kruskal's algorithm with an example? [10M]
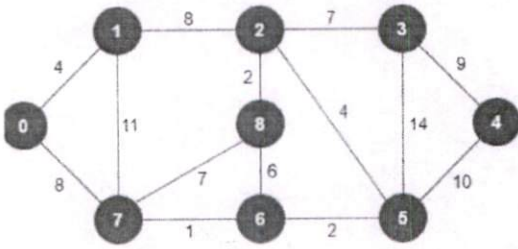
OR

11.a) Write the algorithm for breadth first search spanning tree. [5M]

b) Apply breadth first search on the following

[5M]

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