Total No. of Questions: 10] [Total no. of pages: 03

II/IV B. TECH DEGREE EXAMINATIONS, JULY/AUGUST-2023

Second Semester

CSE/AM

DISCRETE MATHEMATICS

Time: Three Hours **Maximum: 70 Marks**

Answer ONE Question from each unit. **5 x 14 = 70 M**

All Questions carry equal marks.

UNIT-I

1. a) Let R be the relation from the set A on itself and defined by R={(1,1),(1,3),(3,3),(4,4)} then find the relation matrix.

   b) Discuss converse, contra positive and inverse of an implication with an example.

(OR)

2. a) Using of inference, show that $R \wedge (P \vee Q)$ is a valid conclusion from the premises.

   $P \vee Q, Q \rightarrow R, P \rightarrow M, and \sim M$

   b) Show that $(\exists x)M(x)$ follows logically from the premises $(x)(H(x) \rightarrow M(x))$ and $(\exists x)H(x)$

UNIT-II

3. a) Find the number of arrangements of the letters of "TENNESSEE"

   b) In how many ways can a football team of 11 players be selected from 16 players? How many of them will

   (i) Include 2 particular players?

   (ii) Exclude 2 particular players?

(OR)

4. a) Enumerating r-permutations without repetitions i.e; p(n, r) = n(n-1)(n-2)…..(n-r+1)= $\frac{n!}{(n-r)!}$

   b) What is the coefficient of $x^{12}y^{13}$ in the expansion of $(x+y)^{25}$?

UNIT-III

5. a) Solve a_n-5 a_{n-1}+6 a_{n-2}=0 where a_0=2, a_1=3.

   b) Solve a_n-5 a_{n-1}+6 a_{n-2}=2n, n > 2 with condition the initial a_0=1, a_1=1 using generating function.

(OR)

6. a) Let A={1,2,3} and R={(1,1),(1,4),(4,1),(4,4),(2,2),(2,3),(3,2),(3,3)} write the matrix of 'R' and sketch its graph.

   b) Discuss the various operations on relation.

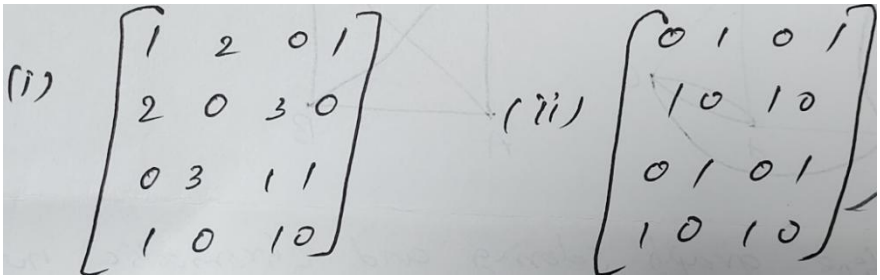
UNIT-IV

7. a) Prove that (D_8,1) is a Lattice where D_8 is the set of all divisors of 8.

   b) Out of 21 persons, 9 eat vegetables, 10 eat fish and 7 eat eggs. 5 persons eat all three. How many persons eat at least two out of the three dishes?

(OR)

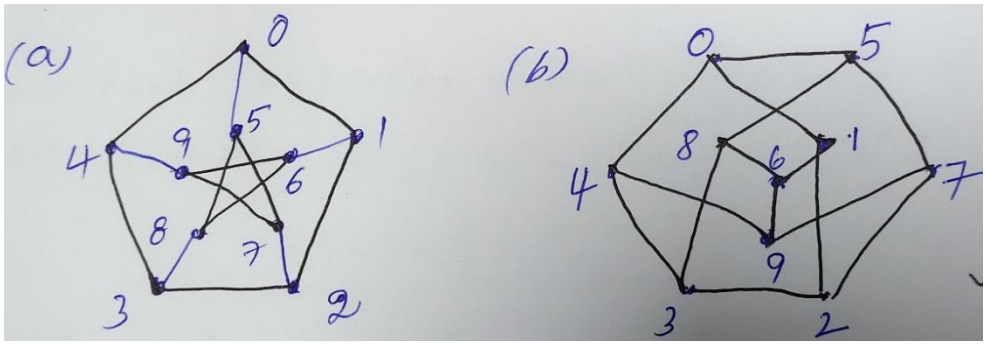
8. a) Draw the graph represented by given adjacency matrix.



   b) If A={1,2,3,4} and 'R' is a relation on A defined by R={(1,2),(1,3),(2,4),(3,2),(3,3),(3,4)}, Find R_2 and R_3 and draw its diagraph

UNIT-V

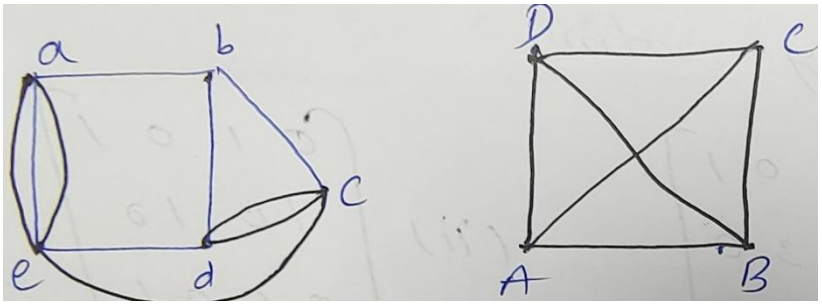
9. a) Examine whether the following graphs are isomorphic or not. Justify your answer.



   b) Explain planar graph, multi graph with examples.

(OR)

10. a) Show that the following graphs are Hamiltonian but not Eulerian.



b) Define graph coloring and chromatic number of a graph and find the chromatic number of

(i) $K_{3,3}$ (ii) cycle with even number of vertices.