

Programme Name & Branch : B.Tech & Computer Science Engineering and Business Systems
 Course Code and Course Name : MAT1004 & Discrete Mathematics
 Faculty Name(s) : Dr. K. Karthika & Dr. S. Dharani
 Class Number(s) : VL2024250106378 & VL2024250106381
 Date of Examination : 19.10.2024
 Exam Duration : 90 minutes

Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M- Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes
 CO 3. Understand the concepts of combinatorics.
 CO 4. Understand the concepts of graph theory and its applications.

Q.No	Question	M	CO	BL
1.	a) How many distinct permutations of the characters in the word APALACHICOLA are there? How many of the permutations have both L's together? b) How many 5-digit telephone numbers can be constructed using the digits 0 to 9, if each number starts with 67 and no digit appears more than once?	10	3	2
2.	A factory makes custom sports cars at an increasing rate. In the first month only one car is made, in the second month two cars are made, and so on, with n cars made in the n^{th} month. Set up a recurrence relation for the number of cars produced in the first n months by this factory. Find an explicit formula for the number of cars produced in the first n months by this factory. How many cars are produced in the first year?	10	3	3
3.	For each of the following degree sequences, draw a graph G , if it exists or explain why no graph exists. a) 4,4,3,2,1 b) 3,2,2,1,0 Also, if the graph exist i) find the complement of the graph G , ii) Write an adjacency matrix for G and its complement.	10	4	2
4.	a) Draw the graph K_7 . Does K_7 have an Euler circuit and a Hamiltonian circuit? If so, write such circuits or give an argument to show why no such circuits exist.	5	4	3
	b) How many paths of length four are there from vertex c to d in the simple graph given below?	5		