VIT
Vellore Institute of Technology

SCHOOL OF ADVANCED SCIENCES
Department of Mathematics

Fall Semester 2023-2024

Continuous Assessment Test – II

Programme Name & Branch : B.Tech
Slot: A2 + TA2 + TAA2
Course Name & Code: Discrete Mathematics and Graph Theory & BMAT205L

Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s): Only hand written notebooks and text books permitted
Answer all the questions (5 x 10 = 50 marks)

Q. No	Question	Marks
1.	Students $S_1, S_2, \ldots, S_{10}$ are to be divided into 3 groups A, B and C such that each group has atleast one student and the group C have at most 3 students. What is the total number of possibilities of forming such groups?	10
2.	Using generating function, solve $a_n = 3a_{n-1} + 4a_{n-2}$ for $n \geq 2$ with $a_0 = 1$ and $a_1 = c$, a constant.	10
3.	Let S be the set of all students at a computer school. Define the relation R as: For all students x and y in S, xRy iff x and y are taking same class. Check the relation R is a Partial Order Relation?	10
4.	Let $T = \{0,1,2,3\}$. Define the binary relation $\leq$ on T^2 as follows: $(x_1, y_1) \leq (x_2, y_2) \Leftrightarrow (x_1 \leq x_2)$ and $(y_1 \leq y_2)$. Then $(T^2, \leq)$ is a partially ordered set. **(a)** Draw the Hasse diagram of partially ordered set. **(b)** Is it a lattice ?	10
5.	Find the minimal sum of product expression of $(\bar{a} + b.\bar{d}).(c.b.a + \bar{c}.d)$	10

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