VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Fall Semester – 2023 ~ 2024

Department of Mathematics

School of Advanced Sciences

Continuous Assessment Test – II

Course Code & Name : BMAT205L – Discrete Mathematics and Graph Theory Slot : A1+TA1+TAA1

Common Question Paper for A1+TA1+TAA1 slot Programme Name & Branch : B.Tech.

Exam Duration : 90 Minutes Maximum Marks : 50

Answer ALL the Questions

Students are permitted to bring any number of text books and hand written note books (class notes)

Each question carries equal marks ($5 \times 10 = 50$ Marks)

1. (*a*). How many positive integers between 1000 and 9999 both inclusive that are divisible by 5 but not by 7?

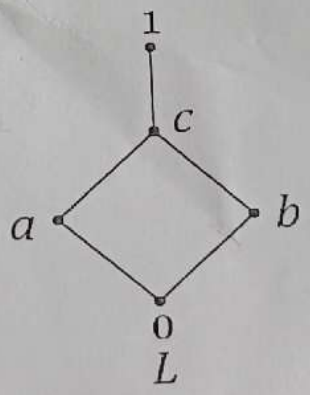
   (*b*). Find the least number of ways of choosing three different numbers from 1 to 10 so that all choices have the same sum.

   [10 M] [CO: 3][BL: L2]

2. Solve the relation $a_n - 3a_{n-1} = n$ where $n \geq 1$ and $a_0 = 1$ using the method of generating functions.

   [10 M] [CO: 3][BL: L5]

3. (*i*). Verify the Complemented and Distributive properties for the given lattice L.



   (*ii*). Let the sets $S_0, S_1, \cdots S_7$ be given by $S_0 = \{a, b, c, d, e, f\}$, $S_1 = \{a, b, c, d, e\}$, $S_2 = \{a, b, c, e, f\}$, $S_3 = \{a, b, c, e\}$, $S_4 = \{a, b, c\}$, $S_5 = \{a, b\}$, $S_6 = \{a, c\}$, $S_7 = \{a\}$. Draw the diagram of $\langle L, \subseteq \rangle$ where $L = \{S_0, S_1, \cdots S_7\}$.

   [10 M] [CO: 4][BL: L3]

P.T.O

4. (i). Simplify the boolean expression $c * (b \oplus c) * (a \oplus b \oplus c)$.

(ii). If $x \oplus y = x \oplus z$ and $x' \oplus y = x' \oplus z$, then prove that $y = z$.

[10 M] [CO: 4][BL: L2]

5. Obtain the product-of-sums canonical forms and sum-of-products canonical forms for the expression $(x \oplus z) * y$.

[10 M] [CO: 4][BL: L4]

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