

**ANNAI VIOLET ARTS AND SCIENCE COLLEGE  
DEPARTMENT OF MATHEMATICS**

**CONTINUOUS INTERNAL ASSESSMENT – I (ODD SEM.)  
SUBJECT : DISCRETE MATHEMATICS**

Prepared by  
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**Class : III B.Sc (MATHS)**  
**Max.Marks : 50**

**Date : 05.09.2022-FN**  
**Sub. Code:**

**PART A (5 × 2 = 10 Marks)**  
**Answer any FIVE questions**

1. What is mean by subset.
2. Compute the gcd of 42823 and 6409.
3. Describe Boolean algebra.
4. Mention CNF.
5. Transform the following CNF into DNF  $(x' + y)(x + y')$ .
6. Define simpler circuit.
7. Construct and sketch the simpler circuit for the following  $xy + y'(x + z)$ .

**PART B – (2 × 5 = 10 Marks)**  
**Answer any TWO questions**

8. State and prove Division algorithm.
9. Show that a complete CNF is identically zero.
10. Prepare a switching table and sketch the switching circuit for the following (a)  $(xy' + x'y'z + x'z')$  (b)  $xy + z(xy' + x'y)$ .

**PART C – (3 × 10 = 30 Marks)**  
**Answer ALL questions**

11. Establish that if m and n are two positive integers an  $m = qn + r$ , with  $0 \leq r < n$ , then  $\gcd(m, n) = \gcd(n, r)$ .
12. Express the following Boolean expression in DNF (a)  $x_1x_2 + x_1$   
(b)  $(x_1x_2') + (x_1 + x_2)$  (c)  $1 + x_2'x_1'$  (d)  $(x_1x_2)(x_1' + x_2)(x_1 + x_2')$
13. Let  $f: B^n \rightarrow B$  be a function such that  $f \neq 0$ . Then there exists a Boolean expression  $\alpha$  in DNF such that  $f(b_1, b_2, \dots, b_n) = \alpha(b_1, b_2, \dots, b_n)$  for all  $(b_1, b_2, \dots, b_n) \in B^n$ .