

Time : 2 Hrs

Max. Marks : 50

SECTION-A (10 x 2 = 20)

Answer ALL questions.

1. State well ordering principle.
2. Find GCD of (87, 27).
3. What is Sieve of Eratosthenes?
4. Find the canonical factorization of 396.
5. Define linear congruence.
6. State Chinese Remainder theorem.
7. Find the order of 2 (mod 7).
8. Define primitive root with an example.
9. Define encryption and decryption.
10. Define cryptology.

SECTION-B (3x 10 = 30)

Answer any THREE of the following questions.

11. (i) Prove that $2^n > n$, for every natural number n .
(ii) Write the properties of L.C.M.
12. State and prove any five properties of divisibility.
13. Solve the system of linear congruences.
$$x \equiv 3 \pmod{5}$$
$$x \equiv 2 \pmod{5}$$
$$x \equiv 4 \pmod{7}$$
14. (i) Write the properties of Indices.
(ii) Solve $3x^5 \equiv 5 \pmod{7}$.
15. Explain the following
 - (i) Character Ciphers.
 - (ii) Block Ciphers.
 - (iii) Public key cryptography.

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