

**D.K.M.COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1**  
**SEMESTER EXAMINATIONS**  
**NOVEMBER – 2016**                      **15SMA3A**  
**NUMBER THEORY**

**Time : 2 Hrs**

**Max. Marks : 50**

**SECTION-A (10 x 2 = 20)**

**Answer ALL questions.**

1. Define Perfect number with an example.
2. State well – ordering principle.
3. Define canonical factorization with an example.
4. Define Equivalence relation.
5. What is Sieve of Eratosthenes?
6. Write any four properties of Congruences.
7. State Chinese Remainder Theorem.
8. Define primitive root and order (mod  $m$ )
9. Find the order of 2 (mod 7).
10. State any two properties of Indices.

**SECTION-B (3x 10 = 30)**

**Answer any THREE of the following questions.**

11. (a) Let  $S_n = 1 + 2 + 3 + \dots + n$  prove that  $S_n = \frac{1}{2}n(n + 1)$ .  
(b) If  $n \geq 3$ , prove that  $2^{n-1} > n$ .
12. (a) State the properties of L.C.M.  
(b) Find [418, 165].
13. Solve the system of linear congruences.  
$$x \equiv 3 \pmod{5}$$
$$x \equiv 2 \pmod{5}$$
$$x \equiv 4 \pmod{7}$$
14. 5 is a primitive root (mod 7). Find the index of  $t$  relative to 5 for  $t = 1$  to 6.
15. (a) Solve  $3x^5 \equiv 5 \pmod{7}$ .  
(b) Write a short note on cryptology.

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