

**P. S. SCIENCE & H. D. PATEL ARTS COLLEGE, KADI**

**Internal Examination**

**B. Sc. Semester - VI**

**[Mark : 40**

**15-3-2017]**

**Mathematics - 603 (B)**

**[1-30 to 3-30**

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1. [A] State & prove Division Algorithm Theorem. 5
- [B] Attempt Any two. 8
- (1) Solve Diophantine equation  $172x + 20y = 1000$
- (2) Find gcd (12378, 3054)
- (3) Show that the expression  $\frac{a(a^2 + 2)}{3}$  is an integer  
for all  $a \geq 1$
2. [A] The linear congruence  $ax \equiv b \pmod{n}$  has a solution if and only if  $d|b$ , where  $d = \gcd(a, n)$ . If  $d|b$ , then it has  $d$  mutually incongruent solutions modulo  $n$ . 5
- [B] Attempt any two. 8
- (1) Solve :  $17x \equiv 9 \pmod{276}$
- (2) Find remainder when  $4444^{4444}$  is divided by 9.
- (3) Prove that  $53^{103} + 103^{53}$  is divisible by 39.
3. [A] State and prove WILSON'S THEOREM. 6
- [B] Attempt any two. 8
- (1) Use Fermat's method to factor 119143
- (2) Determine the last three digits of the number  $7^{999}$
- (3) If  $P$  is prime, prove that for any integer  $a$ ,  
 $pa^p + (p - 1)! a \ \& \ p \mid (p - 1)! a^p + a$
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