EE2302 Foundations of Information and Data Engineering

Assignment 5 **Due: 11 pm, Oct 21**

Full mark: 16 points

1. (6 points)
   a) Write down the multiplication table for modulo 6.
   b) Does the multiplicative inverse of 3 (mod 6) exist? If so, find its value from the table.
   c) Does the multiplicative inverse of 5 (mod 6) exist? If so, find its value from the table.

2. (4 points) Describe all integer solutions to each of the following equations:
   a) $105x + 121y = 1$
   b) $12345x + 67890y = \gcd(12345,67890)$

3. (2 points) Compute 15^{34} mod 40. Show your steps.

4. (4 marks) Use Fermat's Little Theorem to perform the following tasks.
   a) Compute 9^{794} mod 73.
   b) Solve $x^{86} \equiv 6 \pmod{29}$.