

## EE2302 Foundations of Information Engineering

### Assignment 6

**Due: 11 pm, Oct 18**

Full mark: 14 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  $15^{34} \bmod 40$ . Show your steps.
4. (2 marks) Use Fermat's Little Theorem to perform the following tasks to compute  $9^{794} \bmod 73$ .