Note: Answer ALL questions.

Q1/ Write program in C++ by using Class or Function (choose only Two):
   • Shrinking Generator.
   • J-K Flip Flop Generator.
   • Shift register four times to the left. (Register length is 4-bits)
   • Euler's function.

Q2/ Choose only One
   A- Use Berlekamp-Massey algorithm to find L (Complexity)
      Let \( S^n = 011 \) where \( n = 3 \)
      \( B= \) Use the Geffe generator to perform the following:
      • Draw an electronic circuit.
      • Write the output equation of the Geffe generator.
      • Run generator to find the output sequence.

Q3/ Answer the following:
   A- Encode the word "Stream" by using the random key generated from hardmard generator.
   B- Compute the Addition and Multiplication operations of the following equation:
      \[ F(X) = X^3 + X^2 + 2 \]
      \[ G(X) = X^2 - X + 1 \]

Q4/ Explain in detail of the following: (Choose only Three)
   A- Self-synchronizing stream ciphers.
   B- Irreducible and primitive polynomials with examples.
   C-RC4.
   D- Cipher Feedback Mode.

Q5/ Discuss the following systems (Choose only Two)
   • Pless's
   • Multiplexor
   • Adder
   • Correlation attacker

Q6/ Sequence \( S \) of length \( n = 160 \), check the sequence is random or not (used basic statistical tests). Obtained \( S \) by replicating the following sequence four times:
   \[ 11100 01100 01000 10100 11101 11100 10010 01001 \]