1. The generators for the cyclic additive group \((\mathbb{Z}_6, +, 0)\) are:

   **Solution:**
   
   \[ Z_6 = \langle 5 \rangle = \{5 \times 0 = 0, 5 \times 1 = 5, 5 \times 2 \equiv 4 \pmod{6}, 5 \times 3 \equiv 3 \pmod{6}, 5 \times 4 \equiv 2 \pmod{6}, 5 \times 5 \equiv 1 \pmod{6}\}. \]
   
   \[ = \langle 1 \rangle = \{1 \times 0 = 0, 1 \times 1 = 1, 1 \times 2 = 2, 1 \times 3 = 3, 1 \times 4 = 4, 1 \times 5 = 5\}. \]
   
   Hence 5 and 1 are the generators for the cyclic additive group \((\mathbb{Z}_6, +, 0)\).

   (*Correct option iv.*)

2. The generators for cyclic multiplicative group \((\mathbb{Z}_3^*, \cdot, 1)\) are:

   **Solution:**
   
   \[ Z_3^* = \langle 2 \rangle = \{2^0 = 1, 2^1 = 2, 2^2 \equiv 1 \pmod{3}\}. \]
   
   Hence 2 is the generator for the cyclic multiplicative group \((\mathbb{Z}_3^*, \cdot, 1)\).

   (*Correct option iii.*)

3. The order of the group \((\mathbb{Z}_5, +, \cdot)\) is:

   **Solution:**
   
   Order of the group is equal to number of elements in that group.

   (*Correct option i.*)

4. The primitive polynomial \(\rho(X) = X^3 + X + 1\) is a factor of:

   **Solution:**
   
   A polynomial of degree ‘\(m\)’ is called primitive if it is irreducible, i.e., it cannot be factored, and if it is a factor of \(X^M + 1\), where \(M = 2^m - 1\). Here degree of the polynomial \(m = 3\). Therefore, \(M = 2^3 - 1 = 7\). It is also given that the polynomial is ‘primitive’. Hence, it should be a factor of: \(X^7 + 1\).

   (*Correct option iii.*)
5. The primitive polynomial \( \rho(X) = X^5 + X^3 + 1 \) is a factor of:

**Solution:**
Apply same logic as in question number 4. \( \rho(X) = X^5 + X^3 + 1 \) is a factor of \( X^{31} + 1 \) as \( M = 2^5 - 1 = 31 \).
(correct option iii.)

6. Consider two polynomials \( f_1(X) = 1 + X^2 + X^3 \) and \( f_2(X) = 1 + X^2 + X^4 \). The product of these polynomials over GF(2) is:

**Solution:**
\[
(1 + X^2 + X^3)(1 + X^2 + X^4) = X^7 + X^6 + X^5 + (1 + 1)X^4 + X^3 + (1 + 1)X^2 + 1 = 1 + X^3 + X^5 + X^6 + X^7.
\]
(correct option ii.)

7. The sum of two polynomials \( f_1(X) = 1 + X^2 + X^3 \) and \( f_2(X) = 1 + X^2 + X^4 \) over GF(2) is:

**Solution:**
\[
(1 + X^2 + X^3) + (1 + X^2 + X^4) = (1 + 1) + (1 + 1)X^2 + (1 + 0)X^3 + (1 + 0)X^4 = X^3 + X^4.
\]
(correct option iv.)

8. Consider the polynomial \( f(X) = 4X^2 + 2X^3 + 7X^4 \). The leading coefficient is:

**Solution:**
Leading coefficient is equal to coefficient of highest degree term of the polynomial.
(correct option ii.)

9. Referring to question no. 8, the monic equation is:

**Solution:**
Monic equation is obtained by dividing the all the coefficients of the polynomial with the leading coefficient. (correct option ii.)

10. The generators for the multiplicative group \( (\mathbb{Z}_5^*, \cdot, 1) \) are:

**Solution:**
\[
\mathbb{Z}_5^* = \langle 3 \rangle = \{3^0 = 1, 3^1 = 3, 3^2 \equiv 4(\text{mod } 5), 3^3 \equiv 2(\text{mod } 5), 3^4 \equiv 1(\text{mod } 5) \}.
\]
\[
= \langle 2 \rangle = \{2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 \equiv 3(\text{mod } 5) \}.
\]
(correct option iii.)