1. The generators for the cyclic additive group \((\mathbb{Z}_6, +, 0)\) are: (2 marks)
   
i 6, 1 and 5  
   ii 6, 1  
   iii 2, 3, and 5  
   iv 1, 5  

2. The generators for cyclic multiplicative group \((\mathbb{Z}_3^*, \cdot, 1)\) are: (2 marks)
   
i 3, 2 and 1  
   ii 3  
   iii 2  
   iv 3, 2  

3. The order of the group \((\mathbb{Z}_5, +, \cdot)\) is: (2 marks)
   
i 5  
   ii 3  
   iii 4  
   iv 1  

4. The primitive polynomial \(\rho(X) = X^3 + X + 1\) is a factor of: (2 marks)
   
i \(X^5 + 1\)  
   ii \(X^3 + 1\)  
   iii \(X^7 + 1\)  
   iv None of the above
5. The primitive polynomial \( p(X) = X^5 + X^3 + 1 \) is a factor of: (2 marks)
   
   i. \( X^7 + 1 \)  
   ii. \( X^5 + 1 \)  
   iii. \( X^{31} + 1 \)  
   iv. \( X^{29} + 1 \)

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: (2 marks)
   
   i. \( 1 + X^5 + X^6 + X^7 \)  
   ii. \( 1 + X^3 + X^5 + X^6 + X^7 \)  
   iii. \( 1 + X^2 + X^3 + X^5 + X^6 + X^7 \)  
   iv. \( 1 + X^2 + X^3 + X^4 + X^7 \)  

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: (2 marks)
   
   i. \( X^2 + X^3 + X^4 \)  
   ii. \( 1 + X^3 + X^4 \)  
   iii. \( 1 + X^4 \)  
   iv. \( X^3 + X^4 \)  

8. Consider the polynomial \( f(X) = 4X^2 + 2X^3 + 7X^4 \). The leading coefficient is: (2 marks)
   
   i. 2  
   ii. 7  
   iii. 4  
   iv. None of the above  

9. Referring to question no. 8, the monic equation is: (2 mark)
   
   i. \( 2X^2 + X^3 + \frac{7}{2}X^4 \)  
   ii. \( \frac{1}{2}X^2 + \frac{2}{7}X^3 + X^4 \)  
   iii. \( X^2 + \frac{1}{2}X^3 + \frac{7}{2}X^4 \)  
   iv. None of the above
10. The generators for the multiplicative group \((\mathbb{Z}_5^*, \cdot, 1)\) are: (2 marks)

- i 1, 3, 5
- ii 1, 2, 5
- iii 3, 2
- iv 1, 2, 3, 4