1. Please use the truth table to express \((A+B)(A+C)(\overline{A}+\overline{B})\) in Boolean algebra. (10%)

2. Please explain the basic architecture of computer hardware. (15%)

3. Simplify \((A+B+C)(A+B+\overline{C})(A+B+C)(A+\overline{B}+C)\) and draw a block diagram of the circuit for the simplified expression, using AND and OR gates. (10%)

4. Using K-map to derive minimal product-of-sum expression for \(m_0+m_3+m_7+m_8+m_{11}+m_{13}+m_{15}\). (10%)

5. Is computer virus preventable? Please describe the methods. (10%)
6. Why do we need the “green” computer? (10%)

7. If you install shareware in your computer, do you violate the law of the copyright protection? If you distribute the shareware, do you violate the law? What situation will you intrude the law when you use the software from the unknown source? (15%)

8. (a) convert binary expression 0.01111110 to hexadecimal (5%)

(b) convert decimal number 4429.625 to corresponding octal expression (5%)

9. If we use four binary digits in the instruction word to indicate which index register is used, or if one is to be used at all, how many index registers can be used in the machine? (5%)

10. How many different binary numbers can be stored in a register of 12 switches? (5%)