

1. Please fill out the correct answers in the brackets.

- (1) Given the function $F=A'B'+BC'(A+B+C')$, its inverse function $F'=(\quad)$.
- (2) Given the function $F=(X+Y)(Y+Z')(Y+XZ')$, its dual function $F^D=(\quad)$.
- (3) Given $V_{OHmin}=3.5V$ and $V_{IHmin}=2.1V$, the high state direct current noise margin is $(\quad)V$.
- (4) Given $I_{OL}=4.2mA$ and $I_{IL}=0.02mA$, the low state fanout is (\quad) .
- (5) Given the decimal number $(110)_{10}$, its equivalent octal number is $(\quad)_8$.

2. True or false. Please write "√" or "×" in the brackets.

- (1) Given the binary numbers $A=(-1001\ 1011)_2$ and $B=(+1110\ 0001)_2$, the 9-bit sum is $A+B=(\ 0\ 0100\ 0110\)_2$'s complement. (\quad)
- (2) Given the function $F=AB'C+ACD+A'C$, it is not equivalent to $F=AB'C+ACD+A'C+B'C$. (\quad)
- (3) Given the function $F=A'BC+AC'D'$, it has a hazard. (\quad)
- (4) Given the decimal number $(908)_{10}$, its equivalent 8421 BCD code is 1001 000 1000. (\quad)
- (5) Given the function $F=(A'+BC)'(A+C)$, its sum of minterms is $F=\sum m(4,5,6)$. (\quad)

Note: A is the most significant bit (the highest bit).

3. Write the true table of the function.

- (1) $F=ABC+A'C+BC'$
- (2) $F=(A'+B+C)(B'+C)(A+C)$

4. Draw the K-map and K-circles of the function. Write the expression by NAND gates only. Write the expression by NOR gates only.

$$F=AB'+C'D+AC(B'+D)+B'(A'+C+D')$$

5. Use the 3-8 decoder and NAND gate to implement the function. Write the truth table and expression. Draw the circuit diagram.

$$F=AB+A'C+BC$$

6. Use the 4-to-1 line data selector to implement the function. Write the truth table and expression. Draw the circuit diagram.

$$F=AB'C+A'C'+B'C'$$

7. Simplify the function by formulas.

$$F=AB'+(AB')'CD'+BC+AC+AB'C+ACD'$$

8. Calculate the open voltage U_{oc} , the short-circuited current I_{sc} , and the equivalent resistance R_{eq} of the circuit.

