-, True/False

- 1. A periodic waveform has a time period of 25ms and a pulse width of 5ms. The duty cycle is 20%.
- 2. Repeated division-by-10 is used to convert decimal numbers to binary numbers.
- 3.  $(11101000)_2$  is the 2's complement representation of -24.
- 4. The inputs to an AND gate are: A=1, B=0, C=1. The output will be LOW.
- 5. Full-adders can add two numbers and need not have a carry input or a carry output.

6. The look-ahead-carry adder is slower than the ripple-carry adder, since it requires additional logic circuits.

- 7. Full-adders can be used as a BCD-to-binary converter.
- 8. A multiplexer has multiple inputs and a single output.

9. Parity generators/checkers are useful because they do not require any additional data lines to function.

10. The commutative law of Boolean addition states that A+B=A \* B

- □, Multiple Choice
- 1. In a positive logic system, the HIGH level is usually represented by\_\_\_\_\_.

   a. 0V
   b. +1V
   c. +5V
   d. 9V
- 2. Pulse width is defined as the\_\_\_\_\_
  - a. time that the pulse remains at the HIGH level.
  - b. time differential between the rising and falling edges.
  - c. length of the pulse measured at the LOW level.
  - d. duration of the pulse at the 50% level.
- 3. A negative-AND gate is functionally equivalent to a/an \_\_\_\_\_
  - a. AND gate with active-LOW inputs
  - b. NOR gate with active-LOW inputs
  - c. OR gate with active-LOW inputs
  - d. NOT gate with active-HIGH inputs
- 4. Which type of gate can be used to add two bits?a. NANDb. NORc. XORd. XNAND

- 5. What is one disadvantage of the ripple-carry adder?
  - a. The interconnections are more complex.
  - b. More stages are required to a full-adder.
  - c. It is slow, due to propagation time.
  - d. All of the above are correct.
- 6. The following figure shows a \_\_\_\_\_\_ and for the inputs shown, the outputs(A3,A2,A1,A0) will be\_\_\_\_\_\_.
  - a. BCD-to-decimal decoder,1001
  - b. decimal-to-BCD priority encoder,1001
  - c. BCD-to-decimal decoder,0110
  - d. decimal-to-BCD encoder,1001



- 7. What is the decimal number for the BCD number, 10110110?
  - a. 182
  - b. 36
  - c. 116
  - d. Not a valid BCD number
- 8. Which of the following is an important feature of the sum of products form of expressions?
  - a. All logic circuits are reduced to nothing more than simple AND and OR gates.
  - b. The delay times are greatly reduced over other forms.
  - c. No signal must pass through more than 2 gates, not including inverters.
  - d. The maximum number of gates that any signal must pass through is reduced by a factor of two.
- 9. A Karnaugh map will\_\_\_\_\_.
  - a. eliminate the need for tedious Boolean simplifications.
  - b. allow any circuit to be implemented with just AND and OR gates.
  - c. produce the simplest sum of products expression.
  - d. give an overall picture of how the signals flow through the logic circuit.

 $\Xi$ , Problems

1. 设计一个译码电路, 其输入为奇数时, 即当输入 ABC=001, 011, 101, 111 时, 电路输出 高电平。

2. 用一片 4 16 译码器 74HC154 实现以下多输出逻辑函数,必要时可用逻辑门。

$$\begin{split} F_1(A,B,C,D) &= \sum m(2,4,10,11,12,13) \\ F_2(A,B,C,D) &= \prod M(0,1,2,5,6,7,8,9,11,12,15) \\ F_3(A,B,C,D) &= AB\overline{C} + ACD \end{split}$$

3. 分别用 8 选 1 数据选择器 74HC151 和 16 选 1 数据选择器 74HC150 实现以下逻辑函数:

$$Y_1(A, B, C, D) = AB + CD$$