

**TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.**

- 1) In binary addition,  $1 + 0 = 1$ . 1) \_\_\_\_\_
- 2) In binary addition,  $0 + 0 = 00$ . 2) \_\_\_\_\_
- 3) In binary addition,  $1 + 1 = 10$ . 3) \_\_\_\_\_
- 4) A half-adder has no carry-in bit. 4) \_\_\_\_\_
- 5) A group of four bits is called a byte. 5) \_\_\_\_\_
- 6) Adders with greater bit capacities can be constructed by connecting 2-bit adders. 6) \_\_\_\_\_
- 7) Full-adders do not provide for a carry input or a carry output. 7) \_\_\_\_\_
- 8) The look-ahead-carry adder is slower than the ripple-carry adder because it requires additional logic circuits. 8) \_\_\_\_\_
- 9) When paralleling 2-bit full-adders, the carry-out of each stage is connected to the carry-in of the next-higher stage. 9) \_\_\_\_\_
- 10) Full-adders can be used as a BCD-to-binary converters. 10) \_\_\_\_\_
- 11) A BCD-to-decimal decoder can be classified as a 4-line to 10-line decoder. 11) \_\_\_\_\_
- 12) A BCD-to-7-segment decoder can be classified as a 10-line to 7-line decoder. 12) \_\_\_\_\_
- 13) The function of a decoder is to break a decimal or other character code down into a binary code. 13) \_\_\_\_\_
- 14) Converting a decimal number to its binary equivalent is an example of encoding. 14) \_\_\_\_\_
- 15) A multiplexer has multiple inputs and a single output. 15) \_\_\_\_\_
- 16) Demultiplexers are also known as data distributors. 16) \_\_\_\_\_
- 17) A demultiplexer has multiple inputs and a single output. 17) \_\_\_\_\_
- 18) A demux basically reverses the function of a mux. 18) \_\_\_\_\_
- 19) A mux basically reverses the function of a demux. 19) \_\_\_\_\_
- 20) Decoder glitches can be eliminated by a method known as *stripping*. 20) \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 21) The carry output of a half-adder can be expressed as \_\_\_\_\_. 21) \_\_\_\_\_  
A)  $C_{out} = A + B$       B)  $C_{out} = AB$       C)  $C_{out} = A \oplus B$       D) none of these
- 22) The expression  $A \oplus B$  represents \_\_\_\_\_. 22) \_\_\_\_\_  
A) the carry output of a full-adder      B) the carry output of a half-adder  
C) the sum output of a full-adder      D) the sum output of a half-adder

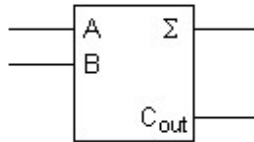


Figure 6-1

- 23) The symbol in Figure 6-1 represents a \_\_\_\_\_. 23) \_\_\_\_\_  
 A) full-adder B) PLD C) AND function D) half-adder
- 24) Refer to the symbol in Figure 6-1. When  $A = 0$  and  $B = 1$ , \_\_\_\_\_. 24) \_\_\_\_\_  
 A)  $\Sigma = 1$ ,  $C_{out} = 1$  B)  $\Sigma = 1$ ,  $C_{out} = 0$  C)  $\Sigma = 0$ ,  $C_{out} = 0$  D)  $\Sigma = 0$ ,  $C_{out} = 1$
- 25) Referring to the symbol in Figure 6-1, which combination of outputs should never occur? 25) \_\_\_\_\_  
 A)  $\Sigma = 0$ ,  $C_{out} = 0$  B)  $\Sigma = 1$ ,  $C_{out} = 0$  C)  $\Sigma = 1$ ,  $C_{out} = 1$  D)  $\Sigma = 0$ ,  $C_{out} = 1$
- 26) What is the major difference between half-adders and full-adders? 26) \_\_\_\_\_  
 A) Full-adders have a carry input capability.  
 B) Half-adders can only handle single digit numbers.  
 C) Full-adders are made up of two half-adders.  
 D) Full-adders can handle double digit numbers.
- 27) Which of the following is correct for full-adders? 27) \_\_\_\_\_  
 A) The first stage of a parallel full-adder may be a half-adder.  
 B) Full-adders are used to make half-adders.  
 C) Full-adders have the capability of directly adding decimal numbers.  
 D) Full-adders are limited to two inputs, since there are only two binary digits.
- 28) The expression  $(A \oplus B) \oplus C_{in}$  describes \_\_\_\_\_. 28) \_\_\_\_\_  
 A) the carry output of a full-adder B) the sum output of a full-adder  
 C) the carry output of a half-adder D) the sum output of a half-adder
- 29) The expression  $AB + (A \oplus B) C_{in}$  describes \_\_\_\_\_. 29) \_\_\_\_\_  
 A) the sum output of a full-adder B) the carry output of a half-adder  
 C) the carry output of a full-adder D) the sum output of a half-adder

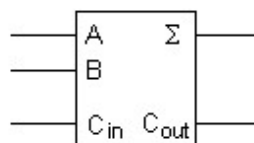


Figure 6-2

- 30) The symbol in Figure 6-2 represents a \_\_\_\_\_. 30) \_\_\_\_\_  
 A) full-adder B) And function C) half-adder D) PLD
- 31) Refer to the symbol in Figure 6-2. What are the output when  $A = 1$ ,  $B = 1$ ,  $C_{in} = 0$ ? 31) \_\_\_\_\_  
 A)  $\Sigma = 0$ ,  $C_{out} = 1$  B)  $\Sigma = 0$ ,  $C_{out} = 0$  C)  $\Sigma = 1$ ,  $C_{out} = 0$  D)  $\Sigma = 1$ ,  $C_{out} = 1$

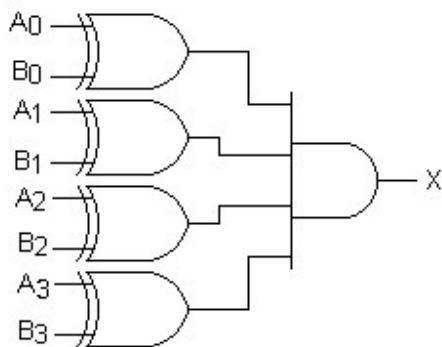
32) Refer to the symbol in Figure 6-2. What are the output when  $A = 1$ ,  $B = 1$ ,  $C_{in} = 1$ ? 32) \_\_\_\_\_  
 A)  $\Sigma = 0$ ,  $C_{out} = 0$       B)  $\Sigma = 1$ ,  $C_{out} = 0$       C)  $\Sigma = 1$ ,  $C_{out} = 1$       D)  $\Sigma = 0$ ,  $C_{out} = 1$

33) What is one disadvantage of the ripple-carry adder? 33) \_\_\_\_\_  
 A) More stages are required to a full-adder.      B) The interconnections are more complex.  
 C) It is slow, due to propagation time.      D) All of the above are correct.

34) What is one advantage of the look-ahead-carry adder? 34) \_\_\_\_\_  
 A) It is easier to implement logically than a full-adder.  
 B) It requires advance knowledge of the final answer.  
 C) It is slower than the ripple-carry adder.  
 D) It is faster than a ripple-carry adder.

35) Which of the following is true for IC comparator circuits? 35) \_\_\_\_\_  
 A) Comparators can compare only 2 bits at a time.  
 B) All comparators have outputs for indicating  $A < B$ ,  $A > B$ , and  $A = B$ .  
 C) Comparators can compare only two values at a time.  
 D) None of these

36) The circuit below can be used as a \_\_\_\_\_. 36) \_\_\_\_\_



- A) 4-bit half-adder      B) 4-bit comparator  
 C) dual 4-line multiplexer      D) 8-bit comparator

37) Which statement below best describes the function of a decoder? 37) \_\_\_\_\_  
 A) A decoder will convert a decimal number into the proper binary equivalent.  
 B) Decoders are special ICs that are used to make it possible for one brand of computer to talk to another.  
 C) Decoders are used to prevent improper operation of digital systems.  
 D) A decoder will convert a binary number into a specific output representing a particular character or digit.

38) The function  $\overline{A}\overline{B}C\overline{D}$  can be decoded with \_\_\_\_\_. 38) \_\_\_\_\_  
 A) two 2-input OR gates and one inverter      B) two 2-input OR gates and two inverters  
 C) one 4-input AND gate and one inverter      D) one 4-input AND gate and two inverters

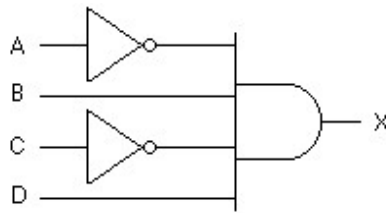


Figure 6-3

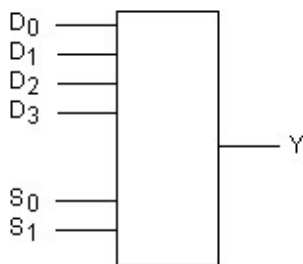
- 39) The output of the decoder in Figure 6-3 will be 1 only when \_\_\_\_\_. 39) \_\_\_\_\_
- A) A = 0, B = 1, C = 0, D = 1      B) A = 1, B = 1, C = 1, D = 1
- C) A = 0, B = 0, C = 0, D = 0      D) A = 1, B = 0, C = 1, D = 0

- 40) The boolean expression for the decoder in Figure 6-3 is \_\_\_\_\_. 40) \_\_\_\_\_
- A)  $X = \overline{A}B\overline{C}D$       B)  $X = A\overline{B}C\overline{D}$       C)  $X = ABCD$       D) None of these

- 41) A 1-of-16 decoder IC has \_\_\_\_\_ data input connection(s). 41) \_\_\_\_\_
- A) 16      B) 4      C) 1      D) 8

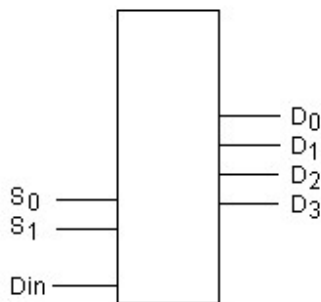
- 42) A BCD-to-decimal decoder has \_\_\_\_\_ data input lines and \_\_\_\_\_ data output lines. 42) \_\_\_\_\_
- A) 10,10      B) 4, 10      C) 7,9      D) 1,10

- 43) The symbol below most likely represents a \_\_\_\_\_. 43) \_\_\_\_\_



- A) comparator      B) multiplexer      C) demultiplexer      D) full-adder
- 44) What is another name used for a multiplexer? 44) \_\_\_\_\_
- A) Attenuator      B) Demultiplexer      C) Data selector      D) Multiplier
- 45) A multiplexer with four select, or address, lines can select one of \_\_\_\_\_ inputs. 45) \_\_\_\_\_
- A) 7      B) 16      C) 3      D) 15

- 46) The symbol below most likely represents a \_\_\_\_\_. 46) \_\_\_\_\_



- A) demultiplexer      B) multiplexer      C) comparator      D) full-adder