MCA : NIMCET 2008

Computer

91. A CPU has an arithmetic unit that adds bytes and then sets its V, C and Z flag nits as follows : The V-nit is set if arithmetic overflow occurs. The C-bit is set if a carry-out is generated from the most significant bit during an operation. The Z-bit is set if the result is zero. What are the values of the V,C and Z flag bits respectively after the 8-bit bytes 1100 1100 and 1000 1111 are added ?
(a) 0, 0, 0 (b) 1, 1, 0
(c) 1, 1, 1 (d) 0, 1, 0

92. Which one of the following statements is always true ?
(a) A compiled program uses more memory than an interpreted program
(b) A compiler converts a program to a lower level language for execution
(c) A compiler for a high level language takes less memory than its interpreter
(d) Compiled programs take more time to execute than interpreted programs.

93. Floating point number in a computer are represented using a 10-bit mantissa (including a sing bit)and a 7-bit exponent (including a sing bit). What is the approximate value of the maximum number, which can be represented ? Assume that the mantissa is stored in the normalised form, that is, without leading zeroes.
(a) 2^{128} (b) 2^{127}
(c) 2^{64} (b) 2^{63}

94. The capacity of a memory unit is defined by the number of words multiplied by the number of bits per word. How many separate address and data line are needed for a memory of $4K \times 16$?
(a) 10 address lines and 16 data lines
(b) 12 address lines and 12 data lines
(c) 12 address lines and 16 data lines
(d) 12 address lines and 8 data lines

95. The main disadvantage of cache organization is that
(a) It doesn't allow simultaneous access to the intended data and its tag
(b) It is more expensive than other type of organization
(c) The cache hit ratio is degraded if two or more block frame in the cache
(d) The number of block required for the cache increases linearly with the size of the main memory

96. Let A [1....10] be an array, Let $A[i] = 2i$ for $1 \le i \le 10$. After the assignment $j = A[A[5]]$ is executed, the value of $A[j]$ is equal to
(a) Undefined (b) 1
(c) 5 (d) 10

97. The first instruction of bootstrap loader program of an operating system is stored in
(a) RAM (b) BIOS
(c)Hard disk (d) None of these

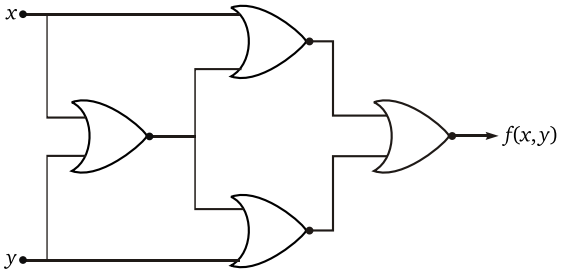
98. The function $AB'C + A'BC + A'B'C + AB'C'$ is equivalent to
(a) $AC' + AB + A'C$ (b)$AB' + AC' +' AC$
(c) $A'B + AC' + AB'$ (d) $A'B + AC + AB'$

99. The addition of 4 bit, 2' s compliment binary number 1101 and 0100 results in
(a) 0001 and an overflow
(b) 1001 and no overflow
(c) 0001 and no overflow
(d) 1001 and an overflow

100. Given $\sqrt{(224)}_r = (13)_r$ the value of radix r is
(a) 10 (b)8 (c) 6 (d) 5

101. Let A=11111010 and B=00001010 be two 8 bit 2's complement number. There product in 2's complement is
(a)11000100 (b) 10011100
(c) 10100101 (c) 11010101

102. Identify the logic function performed by the circuit.



(a) Exclusive Or (b) Exclusive NOR
(c) NAND (d) NOR

103. Which of the following is (are) true about virtual memory systems that uses pages ?
(i) The virtual address space can be larger than the amount of physical memory
(ii) Programs must be resident in main memory throughout their execution
(iii) Pages correspond to semantic characteristics of the programs
(a) i only (b) ii only (c) i and ii (d) i and iii

104. The minimum number of gates needed to implement the Boolean function.
$f(x, y, z) = z(x + y) + \overline{(\bar{z} + x + y)(\bar{x} + \bar{y})}$
(a) 2 (b) 3 (c) 4 (d) 5

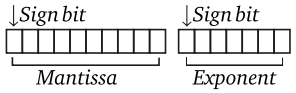
105. How many bits are required to store an ASCII character ?
(a) 7 (b) 6
(c) 8 (d) None of these

Explanations

91. (b)
$$\begin{array}{r} 1\ 1\ 0\ 0\ 1\ 1\ 0\ 0 \\ +\ 1\ 0\ 0\ 0\ 1\ 1\ 1\ 1 \\ \hline 1\ 0\ 1\ 0\ 1\ 1\ 0\ 1\ 1 \end{array}$$
$V = 1$, as there is an overflow
$C = 1$, as carry out is generated by most significant bits.
$Z = 0$, as the result is not zero
So, 1, 1, 0 is the bits obtained.

92. (b) it is always true.

93. (d)



Maximum number $= 111111111 \times 2^{(111111)_2} = 2^{63}$

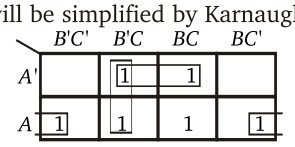
94. (c) $4K \times 16 = 2^{12} \times 16$
$\Rightarrow$ We should have 12 address lines and 16 data lines.

95. (d)

96. (a) As $A[i] = 2i$, so $j = A[A[5]]$
$\Rightarrow$ $j = A[0] = 20$; but $A[j] = A[20]$
is not defined, As, A takes values from 1 to 10.

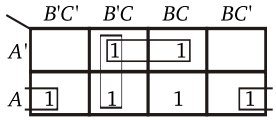
97. (b) BIOS = Basic Input Output System.

98. (b) It will be simplified by Karnaugh map as follows.



$\Rightarrow$ Function is $AC' + B'C + A'C$

or



$= A'C + AB' + AC'$

99. (c) 2's complement of 1101 is 0011
2's complement of 0100 is 1100
$$\begin{array}{r} 0\ 0\ 1\ 1 \\ +\ 1\ 1\ 0\ 0 \\ \hline 1\ 1\ 1\ 1 \end{array}$$
It's 2's complement is 0001. Also, there is no overflow.

100. (d) $\sqrt{(224)_r} = (13)_r \Rightarrow \sqrt{2r^2 + 2r + 4} = r + 3$
$\Rightarrow$ $2r^2 + 2r + 4 - (r + 3)^2 = r^2 + 6r + 9$
$\Rightarrow$ $r^2 - 4r - 5 = 0 \Rightarrow (r - 5)(r + 1) = 0$
$\Rightarrow$ $r = -1,\ 5$
As a cannot be -1, so $r = 5$.

101. (e) 2's complement of $A = 00000110$
2's complement of $B = 11110110$

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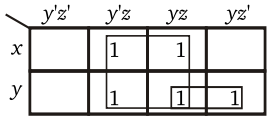
$$\begin{array}{r} 1\ 1\ 1\ 1\ 0\ 1\ 1\ 0 \\ \times\ \ 0\ 0\ 0\ 0\ 0\ 1\ 1\ 0 \\ \hline 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0 \\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 0 \\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 0 \\ \hline 1\ 0\ 1\ 1\ 1\ 0\ 0\ 0\ 1\ 0\ 0 \end{array}$$

8, bit representation of 1 0 1 1 1 0 0 0 1 0 0 is 1 1 0 0 0 1 0 0

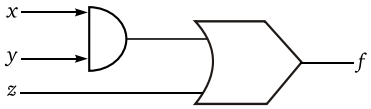
102. (b) The given figure represent
$\overline{(x'y + xy')} = xy + x'y'$
which is exclusive NOR.

103. (c)

104. (a) $z(x + y) + \overline{(\bar{z} + x + y)(\bar{x} + \bar{y})}$
$= z(x + y) + (z\bar{x}\,\bar{y}) + (xy)$
$= xy + yz + zx + z\bar{x}\,\bar{y}$
K-MAP solution is



$\Rightarrow$ $f(x, y, z) = z + xy$



It requires two gates.

105. (a) 106. (b) 107. (c)