CSE 271 – Fall 2004

Return this exam! No calculators!

Exam 1

Name: SSN:

1. **(2 pt.)** Convert 101101_2 to decimal.

   a) 42

   b) 45

   c) 49

   d) 84

   e) None of the above.

2. **(2 pt.)** Convert 73_{10} to binary.

   a) 1001001_2

   b) 1010111_2

   c) 0111111_2

   d) 1010010_2

   e) None of the above.

3. **(2 pt.)** Convert 73_{16} to decimal.

   a) 115_{10}

   b) 71_{10}

   c) 57_{10}

   d) 39_{10}

   e) None of the above.

For questions 4-7 assume $F(A, B, C) = (A(B' + C)' + A'B)'$

4. **(2 pt.)** What does F(0,1,0) equal?

   a) 0
   b) 1
   c) B
   d) B'
   e) Not enough information.

5. **(2 pt.)** What does F(1,B,1) equal?

   a) 0
   b) 1
   c) B
   d) B'
   e) Not enough information.

6. **(2 pt.)** How many AND gates does it take to realize F as shown (do not simplify)?

   a) 1
   b) 2
   c) 3
   d) 4
   e) None of the above.

7. **(2 pt.)** What is the SOP_{min} expression for F?

   a) (A(B'+C)' + A'B)'
   b) (ABC' + A'B)'
   c) (A'+B'+C)(A + B')
   d) A'B' + AB' + B' + AC + B'C
   e) None of the above.

8. **(1 pt.)** Assume a word size of 6-bits. If overflow occurs indicate it, otherwise identify the correct answer: $101010_2 + 011011_2$

   a) 000101_2

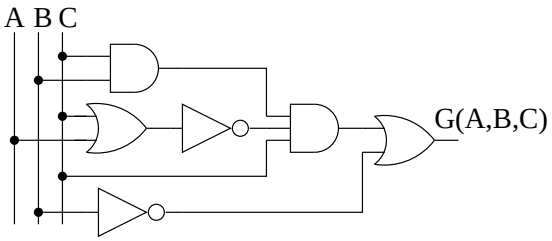
   b) 1000101_2

   c) 111111_2

   d) 101011_2

   e) Overflow occurs.

For questions 9-10 use the figure below.



9. **(2 pt.)** What is the symbolic representation of $G(A, B, C)$ (do not simplify).

   a) BC + (A + C)' + B'

   b) BC(A+C)' + B'

   c) BC(A+C)'C + B'

   d) B'

   e) None of the above.

10. **(2 pt.)** What is G(1,1,0)=?

    a) 1

    b) 0

11. **(2 pt.)** Does (X+Y)(X'+Z) = XZ + Y(X'+Z) ?

    a) Yes

    b) No

12. **(2 pt.)** You are working on a kmap and find a legal grouping of 8 1's which requires 3 variables to represent. How many variables does the function have?

    a) 3
    b) 4
    c) 5
    d) 6
    e) Not enough information.

13. **(1 pt.)** A cell in a 7 variable kmap is adjacent to how many other cells?

    a) 4
    b) 6
    c) 8
    d) 10
    e) None of the above.

14. **(2 pt.)** How many rows does a truth table of 9 variables have?

    a) 81
    b) 256
    c) 512
    d) 729
    e) 1024

15. **(1 pt.)** Which of the following is not shared by all the representations of a logical function?

    a) a description of the number of inputs
    b) a description of the number of outputs
    c) a description of the circuits behavior
    d) a descriptions of the circuits cost

16. **(2 pt.)** How many different SOP_{min} solutions exist for $F(A,B,C,D)=\Sigma m(0,1,3,6,7,8,10,12,13,15)$?

    a) 2
    b) 4
    c) 6
    d) 12
    e) None of the above

$AB\backslash CD$	00	01	11	10
00				
01				
11				
10				

17. **(4 pt.)** Determine the SOP_{min} expression for F(A,B,C,D)=Σm(1,2,3,7,8,10,15)

$AB\backslash CD$	00	01	11	10
00				
01				
11				
10				

a) A'B'D + A'B'D + BCD + BC'D'

b) A'B'D + A'B'D + B'CD + B'CD'

c) A'B'D + A'BD' + BCD + B'CD'

d) A'BD' + A'BD + BCD + B'CD'

e) None of the above.

18. **(4 pt.)** Determine the SOP_{min} expression for F(A,B,C,D)=Σm(0,1,4,6,8,11,13,15)+Σd(2,7,9,14)

$AB\backslash CD$	00	01	11	10
00				
01				
11				
10				

a) A'D' + B'C' + AD

b) A'C'D' + A'CD' + AD + A'D'

c) A'B'C' + AB'C + AD + A'D'

d) A'C'D' + A'B'C' + BCD' + ABD + AB'C'

e) None of the above.

19. **(4 pt.)** Determine the SOP_{min} expression for F(A,B,C,D)=(A+D')(A'+B'+C)(A'+C'+D')(A'+B+C+D)(A'+B+C'+D)

$AB\backslash CD$	00	01	11	10
00				
01				
11				
10				

a) A'D'+BCD'+AB'C'D

b) A'D+BD+AC'D'+AB'C

c) B'D' + AB'C' + CD'

d) CD + BC' + A'D

$AB\backslash CD$	00	01	11	10
00				
01				
11				
10				

e) None of the above.

20. **(3 pt.)**Determine the SOP_{min} realization for F.

A	B	C	F
0	0	X	X
0	1	1	0
X	1	0	X
1	0	0	1
1	X	1	1

$A \backslash BC$	00	01	11	10
0				
1				

a) A+B'+C'

b) AB'C' + AC

c) C'+AC

d) A

e) None of the above.

For questions 20,21 assume that espresso has generated the following output.

```
.i 3
.o 2
.ilb A B C
.ob F G
.p 3
1-1 10
01- 11
-01 01
.e
```

21. **(1 pt.)** Which product term is shared?

a) AC

b) A'B

c) B'C

d) F and G

22. **(1 pt.)** What is the espresso solution for G(A,B,C)?

a) A'B + B'C

b) AC'+ B'C

c) AB' + A'B

d) B'C

e) None of the above.