Continuing Education Course #520
Computer Mathematics

1. What number N is $(1001)_2$ in base-10?
- a. 9
- b. 10
- c. 11
- d. 17

2. What number N is $(111)_2$ in base-10?
- a. 4
- b. 5
- c. 7
- d. 11

3. What number N is $(99)_{10}$ in base-2?
- a. $(1100001)_2$
- b. $(1100011)_2$
- c. $(1100110)_2$
- d. $(1110001)_2$

4. What is $(0.15)_2$ in the base-10 system?
- a. 2/4
- b. 7/4
- c. 5/2
- d. 6/2

5. What is $(0.15)_{10}$ in base-8 (the octal numbering system) using three significant digits?
- a. $(0.112)_8$
- b. $(0.113)_8$
- c. $(0.114)_8$
- d. $(0.117)_8$

6. What is the bit addition of 1+1?
- a. 0 carry 0
- b. 0 carry 1
- c. 1 carry 0
- d. 1 carry 1

7. What is the result of adding following octal numbers?

$(5)_8 + (6)_8$

- a. $(11)_8$
- b. $(31)_8$
- c. $(33)_8$
- d. $(13)_8$

8. What is $(11)_8$ in the hexadecimal number system?

- a. 9
- b. 10
- c. B
- d. C

9. What is the number $(16)_{10}$ in the hexadecimal system?

- a. A
- b. F
- c. $(01)_{16}$
- d. $(10)_{16}$

10. What is the number $(4E2)_{16}$ in base-10?

- a. 1224
- b. 1245
- c. 1248
- d. 1250

11. What number is $(5446)_8$ in base 2?

- a. $(10110010110)_2$
- b. $(100100100110)_2$
- c. $(101100001110)_2$
- d. $(101100100110)_2$

12. What number is $(111001011)_2$ in the octal numbering system?

- a. $(317)_8$
- b. $(316)_8$
- c. $(613)_8$
- d. $(713)_8$

13. What is $(1111111100010001)_2$ in the hexadecimal numbering system?

- a. $(FF11)_{16}$
- b. $(FE01)_{16}$
- c. $(EF01)_{16}$
- d. $(FFE1)_{16}$

14. What is the one's complement of $(110011)_2$?

- a. $(011100)_2$
- b. $(001100)_2$
- c. $(101100)_2$
- d. $(111111)_2$

15. Simulate the operation of a base-10 machine with four digits per number.

What is the difference of $(15)_{10} - (8)_{10}$ in ten's complements?

- a. 0007
- b. 0158
- c. 1007
- d. 9992

16. What is the two's complement of $(01110)_2$ on a 4 digit machine?

- a. $(0001)_2$
- b. $(0010)_2$
- c. $(1110)_2$
- d. $(0111)_2$

17. What is $(0110)_2$ multiplied by $(0010)_2$ using binary multiplication?

- a. $(1100)_2$
- b. $(1101)_2$
- c. $(1110)_2$
- d. $(1111)_2$

18. Division is basically repeated _____?

- a. addition using negatives
- b. complement addition
- c. complement subtraction
- d. subtraction

19. Simulate the operation of a six-digit binary machine. Use one's complements for negative numbers.

What is the machine representation of $(-17)_{10}$?

- a. $(00110)_2$
- b. $(01010)_2$
- c. $(01100)_2$
- d. $(01110)_2$

20. What is the decimal equivalent of $(-15)_{10}$ for the machine using one's complements as negative numbers?

- a. $(1010)_2$
- b. $(0011)_8$
- c. $(15)_{10}$
- d. $(51)_{10}$

21. What expression(s) represents the AND function?

- a. $A \cdot B$
- b. $(A) + (B)$
- c. $A + B$
- d. A / B

22. What is the value of the expression $x + \bar{x}$ and what is the name of the law?

- a. 0 Idempotence
- b. 1 Idempotence
- c. 0 Involution
- d. 1 Complementation

23. A function of three variables follows.

$F = A \cdot \left(\overline{A} + B\right)$

Which of the following is a simplification of the function, F?

- a. A
- b. $\overline{A}$
- c. $A \cdot B$
- d. $A + B$

24. Consider the following expression.

$B \cdot (A + C)$

Which of the following expressions is equivalent and which law is used in the expansion?

- a. $(B + A) \cdot (B + C)$
- b. $(B \cdot A) + (B \cdot C)$
- c. $(B \cdot A) \cdot (B \cdot C)$
- d. $\left(\overline{B} \cdot A\right) + \left(\overline{B} \cdot C\right)$

25. Consider the following expression.

$\overline{(x + y + z + ...)} = \bar{x}\bar{y}\bar{z}...$

Which of the following law is represented by the expression?

- a. Associative
- b. Complementation
- c. DeMorgan
- d. Special Properties