Sri Sai Ram Engineering College
Department of Information Technology

CS 2202- DIGITAL PRINCIPLES AND SYSTEM DESIGN

Part-A Questions and Answers

UNIT-I

Part-A

1. Define a Digital system

   Electronic systems are most reliable when designed for two state operation and this binary system is made use of in digital system.

2. What is a decimal number system?

   A decimal number system has a radix (Base r=10) and uses symbols 0,1,2,3,4,5,6,7,8,9. Eg. $(237)_{10}$

3. Convert $(196.062)_{10}$ to octal.

   $(196.062)_{10} = (304.03757)_8$

4. Convert $(10.175)_8$ to its decimal equivalent.

   $(10.175)_8 = (8.244135)_{10}$

5. Find the 10's complement of 369.369

   Formula=r^n-N

   10's complement=10^3-N

   $\qquad\qquad$ =1000-369.369

   $\qquad\qquad$ =630.631

6. Convert $(2101)_3$ to base 5 number .

   $(2101)_3 = (224)_5$

7. What are the different types of number complements

   Two types of number complements are

   i)$\qquad$ r's complement-10's and 2's Complement

   ii)$\qquad$ (r-1)'s complement-10's and 2's Complement

8. Give the algorithm to perform subtraction using r's complement

The subtraction of two positive numbers (M-N) both of base r may be done as follows.

1. Add the number M to the r's complement of the number N.

2. Inspect the result obtained in step 1 for an end carry.

3. If end carry occurs discard it.

4. If end carry does not occur take the r's complement of the number obtained in step1 and place a negative sign in front of it.

9. Subtract 72532-3250 using 10's complement

   Ans: 69282.

10. Simplify the Boolean equation. f = C (B+C) (A+B+C)

    Ans; c

11. Define min term.

    It is a product term which contains all the literals either in normal form or complement form.

12. Define max term

    It is a sum term which contains all the literals either in normal form or complement form

13. What do you mean by canonical form?

    The representation of Boolean function in SOP or POS form, i.e. each term in the expression must contain all the literals of the function either in normal form or complement form.

14. Define Absorption theorem.

    A +ÂB=A+B

15. Write the condition for a weighted code to be self complementing code.

    Sum of weights =9.

16. State Duality principle.

    The dual of any Boolean function can be obtained by changing each OR sign to an AND sign and vice versa and complementing any 0 or 1 appearing in the expression.

17. What is signed binary number?

In binary system, when the sign is represented by including an additional bit with the magnitude bits, usually a zero represents positive sign and a 1 represents negative sign. These binary numbers are called as signed binary numbers.

18. What is a weighted code? Give example.

Weighted binary code are those which obey the positional weighting principle. Example. 8421 BCD code.

19. What is a non-weighted binary code ?Give example

Non-weighted codes are the codes that are not positionally weighted. That is each position within the binary number is not assigned a fixed value.

Example. Excess 3 code.

20. .What is a gray code?

The gray code is a binary code in which each successive number differs in only one bit position. It is a non-weighted code and not an arithmetic code.

21. Convert gray code 1101 to binary code.

Binary =1001.

22. Encode the number $(2345)_{10}$ in BCD and excess 3.

BCD equivalent : 0010 0011 0100 0101

Excess 3   : 0101 0110 0111 1000

23. What is an Alpha numeric code?

As most of the computers and their peripherals process both alphabetic and numeric information several coding techniques have been invented that represent this alphanumeric information as a series of 1's and 0's. Such codes are called Alpha numeric code.

24. What are error detecting codes?

Digital systems should be accurate to the digit. So, detecting errors are very important. The simplest technique for detecting errors is that of adding an extra bit, known as parity bit. These codes are called error detecting codes.

25. What is sequential code?

A code is said to be sequential when each succeeding code is one binary number greater than its preceeding code. Ex. 8421 BCD, EXCESS 3.

26. What are prime implicants?

Prime implicants are building blocks of minimum SOP expression.

27. What is an universal gate? Why?

All logic gates can be implemented using NAND and NOR gates only. Hence they are known as universal gates.

28. What is K- MAP?

An arrangement of cells representing the combination of literals or variables in the Boolean expression and used for a systematic simplification of the expression.

29. What are the advantages of K-map?

1) Kmap is a more orderly process with well defined steps as compared with the trial and error process sometimes used in algebraic simplification.

2) Requires fewer steps especially for expressions containing many terms, and it always produces a minimum expression.

30. What are don't cares?

Don't care term is a minterm for which the combinational logic may output either 1 or 0.

31. Explain about Tabulation method.

It is a specific step by step procedure that is guaranteed to produce a simplified standard form expression for a function. It has two parts. The first is to find the terms for inclusion in the simplified function. These terms are called prime implicants. The second is to choose among the prime implicants that give an expression with the least number of literals.