

SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E/B.Tech - CSE/IT

Title of the paper: Digital Computer Fundamentals

Semester: III

Sub.Code: 11305-12305(04-05)-6C0044(06-07)

Date: 28-04-2009

Max.Marks: 80

Time: 3 Hours

Session: AN

PART – A

(10 x 2 = 20)

Answer All the Questions

1. Represent the decimal number 8620 in BCD and in excess – 3 code.
2. Perform 9's complement subtraction on the following number:
3570 – 2100.
3. Determine using truth tables whether or not each of the expressions are equal
 - (a) $f = a'c' + a'b + ac$
 - (b) $g = bc + ac + a'c'$
4. Reduce the expression to minimum SOP form $f = abc' + ab'c + a'bc + abc$ (3 terms, 6 literals)
5. Derive the Boolean expressions for the difference term in full subtractor.
6. With a simple block diagram and timing diagram explain delay in combinational logic circuits.
7. Draw the state diagram and behavioral table of SR flip flop.

8. List down the steps involved in the design process of sequential system.
9. Differentiate static and dynamic RAM.
10. What is a cache memory?

PART – B

(5 x 12 = 60)

Answer All the Questions

11. Perform the following conversions
 - (a) decimal 225.225 to binary, octal and hexadecimal. (4)
 - (b) octal 623.77 to decimal, binary, and hexadecimal. (4)
 - (c) hexadecimal 2AC5.D to decimal, octal, and binary. (4)

(or)
12. Compare and contrast the following codes: Binary, Error Detection, Reflection and Alphanumeric codes.
13. (a) Simplify the following Boolean function by means of tabulation method.

$$F(A, B, C, D, E, F, G) = \Sigma (20, 28, 52, 60)$$
 (b) Implement the following function with either NAND or NOR gates. Use only four gates. Only the normal inputs are available.

$$F = w'xz + w'yz + x'yz' + wxy'z$$

$$d = wyz$$

(or)
14. Find the minimum SOP expression using K – Map method for the given expression.

$$H(A, B, C, D, E) = \Sigma m (1, 3, 10, 14, 21, 26, 28, 30) + \Sigma d (5, 12, 17, 29)$$
15. Draw the truth table and Implement one bit full adder circuit using minimum number of NAND gates.

(or)

16. Describe the function of a magnitude comparator and realize it using logic gates.

17. Design a 3bit synchronous counter using JK flip flops.

(or)

18. Reduce the sequential system whose state table is given into one with minimum number of states using tabular method.

Q	Q*		Z	
	X = 0	X = 1	X = 0	X = 1
A	B	D	0	0
B	E	D	1	0
C	B	C	0	0
D	F	A	0	0
E	A	B	1	1
F	E	C	1	0

19. Explain the hierarchical organization of storage in a computer.

(or)

20. Brief on the following: Magnetic bubble, CCD, Optical storage.