

MCA/D06
Computer Organization
MCA -102

Time : 3 Hours

MM:50

Note:- Attempt Five questions in all, selecting at least one from each unit.

UNIT- I

- 1(a) Device a single error. Detecting and correcting Hamming code for decimal numbers represented in excess-3 code. 5
- (b) Simplify the following Boolean function using the theorems of Boolean algebra:
 $F(A,B,C,D) = \sum(0,1,2,3,6,7)$
- 2(a) Using K-map simplify the following Boolean function.
 $F(A,B,C,D) = \sum(1,3,5,8,9,11,15) + \sum(2, 13)$
- (b) obtain a NAND realization of a full adder and full subtractor.
- 3(a) Represent the decimal number 8620 in:
 (i) BCD code (ii) Excess-3-code (iii) 2,4,2,1 code (iv) binary number
- (b) Design a circuit that compares two 4-bit numbers, A and B, to check if they are equal. The circuit has one output x, so that $x=1$ if $A=B$, and $x=0$ if $A \neq B$.
- 4(a) A digital system is to store binary number in a 16-bit register. Assuming 5 bits are reserved for exponent and 11 bits are reserved for the mantissa and sign, how would (-12.4) and (183.25) decimal numbers be represented in this system?
- (b) What do you understand by fixed-point and floating-point representation of information?

UNIT-II

- 5(a) Design an asynchronous ripple counter to count upto 10 in 8-4-2-1 code. Assume that the flip-flop has asynchronous set and reset terminals.
- (b) Consider a JK flip flop i.e. a JK flipflop with an inverter between external input K and internal input K.
 - (i) Obtain the flip flop characteristics table
 - (ii) Obtain the characteristic equation.
 - (i) Show that tying the two external inputs together forms a D flip-flop.
- 6(a) Explain working of magnetic disk alongwith different types of magnetic disks.
- (b) Design a 4-bits bi-directional shift register.

7 Differentiate between

- (i) SRAM and DRAM
- (ii) RAM and ROM
- (i) Magnetic and Optical devices.

UNIT-III

8(a) What is the difference between hard-wired control and microprogram control ?
What are the advantages and disadvantages of each method?

(b) What is the fundamental difference between a subroutine call and an interrupt request? Is it possible to employ a common memory stack for both?

9(a) What is the difference between direct transfer and a transfer with handshaking in a paralleled peripheral interface?

(b) Explain register addressing, immediate addressing, direct addressing, register indirect addressing and base plus index addressing with the help of an example.

10 Write short notes on:

- (i) I/O interface
- (ii) IOP