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**B.E./B.Tech.(Full Time) DEGREE END SEMESTER EXAMINATION, APR/MAY 2012.**

**INFORMATION TECHNOLOGY BRANCH**

**THIRD SEMESTER**

**IT272 – COMPUTER ORGANIZATION**

(REGULATIONS 2004)

**Time: Three hours**

**Max. Mark : 100**

**Answer ALL Questions.**

**PART A -( 10 X 2 = 20 marks)**

1. Given the two binary numbers  $X=1010100$  and  $Y=1000011$ , perform the subtraction  $X-Y$  and  $Y-X$  by using 2's complements.
2. Draw the multiple-level NAND circuit for the following expression:  $(AB'+A'B)C$
3. Give the 4-Bit Adder –Subtractor circuit.
4. What is a Ring Counter?
5. State and explain the CPU performance equation.
6. What is Instruction sequencing and Branching?
7. Distinguish between Hardwired control and Micro-programmed control?
8. What is micro instruction and micro routine?
9. List the sequence of events involved in handling an interrupt request from a device.
10. Give the memory hierarchy. Compare its Speed, Size and Cost.

**PART –B ( 5 X 16 = 80 marks)**

11. a. i) Simplify the following Boolean expression to a) Sum-of-product b) Product-of-sum using K-map (8)  

$$F(A, B, C, D) = A'B' + ACD' + ABC + A'B'CD' + B'D$$
- ii) Simplify the following Boolean function using Tabulation method. (8)  

$$F(w, x, y, z) = \sum (0, 1, 3, 5, 6, 8, 9, 11, 12).$$
12. a. i) With neat block diagram explain the BCD adder. (10)
- ii) Implement the following Boolean function with the multiplexer. (6)  

$$F(A, B, C, D) = \sum (0, 2, 7, 8, 11, 13, 14)$$

**(OR)**

- b. i) Write short notes on Encoder and Magnitude comparator (8)

- ii) A sequential circuit has 2 D flip-flops A and B, two inputs x and y, one output z is specified by the following next-state and output equations (8)

$$A(t+1) = x'y + xB$$

$$B(t+1) = x'A + xB$$

$$z = A$$

A) Draw the logic diagram of the circuit. (4)

B) List the state table for the sequential circuit. (4)

13. a. i) Explain the various addressing modes with example. Registers R1 and R2 of a computer contain the decimal values 1600 and 3000. What is the effective address of the memory operand in the following instruction? ADD -(R2), R1 (8)

ii) Write and explain the Non-Restoring division algorithm with example. (8)

(OR)

b. i) With neat diagram explain the floating point addition subtraction unit. (8)

ii) Explain the concept behind the Booth's multiplication algorithm. Multiply the following signed 2's complement numbers using the Booth's multiplication technique. A=010101 B=110110 (8)

14. a) What are the three types of hazards? Briefly discuss the methods to handle various hazards. (16)

(OR)

b. i) With neat diagram explain the Hardwired control unit. (10)

ii) Write the control sequence for executing the following instruction using single bus organization

ADD R1, R2, R3, assuming a three address dst, src1, src2 format (6)

15. a. i) With example explain how LRU replacement algorithm is used for block replacement in Direct-mapped, Associated-mapped and Set- Associative-mapped cache. (8)

ii) Give the Virtual memory organization and also discuss the virtual-memory address translation. (8)

(OR)

b. i) Write short notes on DMA controllers. (8)

ii) Give the various I/O Devices. With neat diagram explain the I/O device interface (8)