TDC (CBCS) Even Semester Exam., 2024

COMPUTER SCIENCE

(2nd Semester)

Course No. : CSCHCC–201T

(Computer System Architecture)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

UNIT—I

1. Answer any *two* of the following questions : 2×2=4

(a) List the truth table of a three-variable exclusive OR (Odd) function

$$x = A \oplus B \oplus C$$

(b) Simplify the Boolean function using four-variable maps :

$$F(A, B, C, D) = \Sigma(0, 1, 2, 4, 5, 7, 11, 15)$$

(c) What is multiplexer? Give example.

2. Answer any *one* question : 10

(a) *(i)* Explain clocked RS flip-flop and *T* flip-flop. 5

(ii) Design a full-adder circuit using two half-adders and an OR gate. 5

(b) *(i)* Simplify the Boolean function *F* together with the don't care condition *d* in

1. sum of products form
2. product of sums form

$F(w, x, y, z) = \Sigma(0, 1, 2, 3, 7, 8, 10)$

$d(w, x, y, z) = \Sigma(5, 6, 11, 15)$ 5

(ii) Write short notes on the following : 2½+2½=5

1. Shift register
2. Binary counter

UNIT—II

3. Answer any *two* of the following questions : 2×2=4

(a) Convert $(41{\cdot}6875)_{10}$ to binary.

(b) Find the 10's complement subtraction of 72532–13250.

(c) How can floating point number be represented in computer system?

4. Answer any *one* question : 10

(a) *(i)* Write an algorithm for addition and subtraction of signed magnitude numbers. 7

(ii) Represent the decimal number 8620 to the following bases : 3

1. BCD
2. Excess-3 code
3. 2421 code

(b) *(i)* Explain with an example Booth's multiplication algorithm of signed 2's complement number. 7

(ii) What is the difference between fixed point and floating representation? 3

UNIT—III

5. Answer any *two* of the following questions : 2×2=4

(a) Define micro-operation with example.

(b) Define hardwired control and micro-programmed control.

(c) Write a short note on control unit.

6. Answer any *one* question : 10

(a) *(i)* Describe the flowchart of instruction cycle. 5

(ii) Design a 4-bit bus system and draw the diagram. 5

(b) *(i)* Briefly define basic instruction formats. 3

(ii) Briefly describe the functions of computer registers. 7

UNIT—IV

7. Answer any *two* of the following questions : 2×2=4

(a) What is control word? Give example.

(b) Write down the purpose of stack pointer.

(c) What is program counter?

8. Answer any *one* question : 10

(a) *(i)* What are the different addressing modes? Explain with an example. 7

(ii) Write down the difference between RISC and CISC. 3

(b) Write a program to evaluate the arithmetic statement.

$$X = \frac{A - B + C * (D * E - F)}{G + H * K}$$

(i) Using a general register, compute with three address instructions. 5

(ii) Using a general register, compute with two address instructions. 5

UNIT—V

9. Answer any *two* of the following questions : 2×2=4

(a) What are start bit and stop bit?

(b) What is interrupt?

(c) Define DMA.

10. Answer any *one* question : 10

(a) *(i)* Explain DMA controller with block diagram. 5

(ii) Explain the asynchronous mode of data transfer with diagram. 5

(b) *(i)* Explain with diagram, the functions of interrupt controller. 5

(ii) What is the difference between isolated I/O and memory mapped I/O? What are the advantages and disadvantages of each? 3+2=5

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