TDC (CBCS) Even Semester Exam., 2022

COMPUTER APPLICATION

(2nd Semester)

Course No. : CACCC–202T

(Computer System Architecture)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *ten* questions : 2×10=20

1. Write down the principles of NAND and NOR gates with truth table.

2. What is Boolean function? Find the truth table and logic diagram for $F = x + y'z$.

3. Write down the difference between combinational circuit and sequential circuit.

4. What are (r's) complement and ($r-1$)'s complement? Give example.

5. Perform the arithmetic operations $(+42)+(-13)$ and $(-42)-(-13)$ in binary using signed 2's complement representation for negative number.

6. Represent the decimal number +6132·789 in floating point form with a fraction and exponent.

7. Define selective complement operation with example.

8. An 8-bit register contains the binary value 10011100. What is the register value after an arithmetic shift right?

9. What is the difference between hardwired control and microprogrammed control?

10. Define control word with example.

11. Write down the purpose of stack pointer.

12. How effective address is calculated?

13. What is input-output processor?

14. What is memory-mapped I/O?

15. What is hand shaking?

SECTION—B

Answer any *five* questions : 10×5=50

16. *(a)* Given the Boolean expression $F = x'y + xyz'$, show that $F \cdot F' = 0$. 2

(b) Simplify the following Boolean function using 4 varibale K-map : 3

$F(A, B, C, D) = \Sigma(3, 7, 11, 13, 14, 15)$

(c) Simplify the following Boolean functions F together with the don't care conditions d in sum of product forms : 5

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

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

17. *(a)* What is decoder? Draw a logic diagram of a 3-to-8 line decoder. 1+3=4

(b) Explain 4-bit shift register with block diagram. 3

(c) Explain the concept of memory unit with RAM and ROM. 3

18. *(a)* Convert the hexadecimal number F3A7C2 to binary and octal. 1½+1½=3

(b) Perform the subtraction with unsigned decimal numbers by taking the 10's complement of the following subtrahend : 2

5250 – 1321

(c) Multiply (+6) × (–5) using Booth's multiplication algorithm. 5

19. (a) Represent decimal number 8620 in *(i)* BCD, *(ii)* excess-3 code and *(iii)* 2421 code. 3

(b) Explain the hardware for signed 2's complement addition and subtraction. 4

(c) Draw the flowchart for subtracting numbers in signed 2's complement representation. 3

20. (a) What do you mean by microoperations? Explain different types of micro-operations. 7

(b) What are the basic computer instruction formats? 3

21. (a) Explain the process of instruction cycle. 5

(b) Explain bus system for four registers. 5

22. Compare between RISC and CISC in detail. 10

23. Explain instruction format with three address, two address, one address and zero address instruction. 10

24. Explain DMA controller with neat diagram. 10

25. Explain asynchronous data transfer between two independent units. 10

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