

**2024/TDC (CBCS)/EVEN/SEM/
CSCDSC/GEC-201T/133**

TDC (CBCS) Even Semester Exam., 2024

COMPUTER SCIENCE

(2nd Semester)

Course No. : CSCDSC/GEC-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 four of the following questions :

1×4=4

- (a) What is truth table?
- (b) What is Boolean expression?
- (c) Write the difference between combinational circuit and sequential circuit.
- (d) Define register.
- (e) What is half-adder?

(2)

2. Answer any *one* of the following questions : 2

- (a) Simplify the following Boolean function using three-variable map :

$$f(x, y, z) = \Sigma(0, 1, 3, 5, 6)$$

- (b) Implement the Boolean function

$$F = xy + x'y' + y'z$$

with only OR and NOT gates.

3. Answer any *one* of the following questions : 8

- (a) Design a combinational circuit that converts BCD code to Excess-3 code.

- (b) What is flip-flop? Explain the J-K flip-flop.

UNIT—II

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

- (a) Convert the decimal number $(468)_{10}$ to binary number.

- (b) Convert the binary number $(110101)_2$ to octal number.

- (c) What is radix?

(3)

- (d) Find the 2's complement of the following eight-digit binary number :

10101110

- (e) What are the drawbacks of signed magnitude representation?

5. Answer any *one* of the following questions : 2

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

- (b) Represent decimal number 8620 in—

(i) BCD;

(ii) Excess-3 code.

6. Answer any *one* of the following questions : 8

- (a) Explain with an example, Booth multiplication algorithm of signed 2's complement number.

- (b) Write an algorithm for addition and subtraction of signed magnitude numbers.

UNIT—III

7. Answer any *four* of the following questions :

1×4=4

- (a) Define instruction code.

- (b) What is effective address?

(4)

- (c) What is program counter?
- (d) Name the different phases of instruction cycle in the basic computer.
- (e) What is instruction format?

8. Answer any *one* of the following questions : 2

- (a) Define micro-operation with example.
- (b) Explain the difference between direct address and indirect address.

9. Answer any *one* of the following questions : 8

- (a) Briefly describe the functions of computer registers.
- (b) What are the hardware components that consist in the basic computer? With a neat diagram, explain the BUS system for four registers.

UNIT—IV

10. Answer any *four* of the following questions :

1×4=4

- (a) What is control word?
- (b) What is the purpose of stack pointer?
- (c) Define arithmetic micro-operation.

(5)

- (d) Convert the infix arithmetic expression

$$A * B + C * D$$

to reverse polish notation.

- (e) What is the use of mode field?

11. Answer any *one* of the following questions : 2

- (a) Write down the difference between RISC and CISC.
- (b) What are data transfer instructions? Give example.

12. Answer any *one* of the following questions : 8

- (a) What are the different addressing modes? Explain with examples.
- (b) What are basic differences among a branch instruction, a call subroutine instruction and a program interrupt?

UNIT—V

13. Answer any *four* of the following questions :

1×4=4

- (a) What is I/O command?
- (b) What is status command?
- (c) Define data output command.

(d) What is isolated I/O method?

(e) What is strobe?

14. Answer any one of the following questions : 2

(a) What are start bit and stop bit?

(b) Briefly explain asynchronous data transfer.

15. Answer any one of the following questions : 8

(a) Explain the different modes of transfer.

(b) With the block diagram, explain the DMA controller.
