Student's Copy

Professional Course Examination (Odd), 2023

(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Course No. : BCA/3/CC/16

(Computer Organization and Architecture)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(PART : A—OBJECTIVE)

(*Marks* : 25)

SECTION—I

(*Marks* : 15)

I. Tick (✓) the correct answer in the brackets provided : 1×10=10

1. The micro-operation that specifies binary operations for strings of bits stored in register is called

    (a) shift micro-operation ( )

    (b) arithmetic micro-operation ( )

    (c) logic micro-operation ( )

    (d) data micro-operation ( )

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2. The instruction that stores the content of AC into the memory word is

(a) LDA ( )

(b) STA ( )

(c) BUN ( )

(d) ISZ ( )

3. A set of common instructions that can be used in a program many times is called

(a) a subroutine ( )

(b) a loop program ( )

(c) a common program ( )

(d) batch instruction ( )

4. The length of the one-byte instruction is

(a) 2 bytes ( )

(b) 1 byte ( )

(c) 3 bytes ( )

(d) 4 bytes ( )

5. Which one is the fastest memory among the following?

(a) Cache memory ( )

(b) Magnetic memory ( )

(c) Hard disk ( )

(d) Solid-state drive ( )

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6. Effective addressing is used in

   (a) Direct Addressing Mode   ( )

   (b) Indirect Addressing Mode   ( )

   (c) Immediate Addressing Mode   ( )

   (d) Implied Addressing Mode   ( )

7. The reverse polish notation of the following infix expression

$$[A*\{B+C*(D+E)\}]/\{F*(G+H)\}$$

   is

   (a) $ABCDE + * + * FGH + */$ ( )

   (b) $ABCDE * + + * FGH + */$ ( )

   (c) $ABCDE + * + * FGH * + /$ ( )

   (d) $ABCDE + * * + FGH + */$ ( )

8. Which one of the following is considered as the processor register?

   (a) Data Register (DR)   ( )

   (b) Address Register (AR)   ( )

   (c) Accumulator (AC)   ( )

   (d) Instruction Register (IR)   ( )

9. Memory devices that provide backup storage are called

   (a) main memory   ( )

   (b) cache memory   ( )

   (c) tape memory   ( )

   (d) auxiliary memory   ( )

10. The best page replacement algorithm but impossible to implement is

    (a) Optimal Page Replacement   (   )

    (b) FIFO Page Replacement   (   )

    (c) LRU Page Replacement   (   )

    (d) LFU Page Replacement   (   )

II. Indicate whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark in the brackets provided :   1×5=5

1. $R1 \leftarrow R2$ denotes transfer of information from $R1$ to $R2$.

                                                            (T / F)

2. Storage in Register Stack can be accessed using LIFO.

                                                            (T / F)

3. Devices that are under the direct control of the computer are said to be connected online devices.

                                                            (T / F)

4. An address in main memory is called a physical address.

                                                            (T / F)

5. The input/output processor is similar to CPU except that it is designed to handle the details of I/O processing.

                                                            (T / F)

SECTION—II

(Marks : 10)

III. Answer the following questions :

2×5=10

1. (a) What is register transfer language?

OR

(b) Differentiate between half-adder and full-adder.

2. (a) The value of 101010 after 4-circular shift operation will be what?

OR

(b) What are the different types of micro-operations?

3. (a) Differentiate between data transfer instruction and data manipulation instruction.

OR

(b) What is zero-address instruction?

4. (a) Write any two differences between CPU and peripheral devices.

OR

(b) Differentiate between online devices and peripherals.

5. (a) Explain magnetic disk in brief.

OR

(b) Differentiate between RAM and ROM.

5

(PART : B—DESCRIPTIVE)

(Marks : 50)

IV. Answer the following questions :   10×5=50

1. (a) Using 4×1 multiplexers, design a common-bus system for 4-registers and explain how it works.   8

    (b) Write the graphic symbol for 3-state buffer.   2

OR

    (c) What are logic micro-operations? Give one example of logic micro-operations.   3+2=5

    (d) What is micro-operation? Explain briefly the four types of micro-operations.   1+4=5

2. (a) Illustrate the flowchart of instruction cycle and explain.   5

    (b) Differentiate between hardwired control and microprogrammed control.   5

OR

    (c) What is program interrupt? Explain in detail with necessary diagram.   5

    (d) Explain the design of basic computer.   5

3. (a) What are the reasons for which computers use addressing modes?   5

    (b) Explain Central Processing Unit (CPU) organization with suitable diagram.   5

OR

    (c) Write the major characteristics of CISC machine.   4

    (d) Explain one-address, two-address and three-address instruction.   6

4. (a) Explain Direct Memory Access (DMA) with suitable diagram.   5

   (b) Explain an IO module with suitable diagram.   5

   OR

   (c) Write the flowchart of the communication of CPU and IOP.   5

   (d) Explain source-initiated handshake with suitable diagram.   5

5. (a) Write the block diagram and the function table of 128×8 RAM chip and explain how it works.

   8

   (b) What is content addressable memory?

   2

   OR

   (c) Explain the principle of cache memory.

   5

   (d) Explain direct mapping.

   5

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