Professional Course (Odd) Examination , 2024

(CBCS)

(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

(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. How many full adders are needed to add two 4-bit numbers?

   (a) 8 ( ) *(b)* 2 ( )

   (c) 4 ( ) *(d)* 16 ( )

2. An *n*-bit microprocessor has

   (a) *n*-bit instruction register ( )

   (b) *n*-bit address register ( )

   (c) *n*-bit program counter ( )

   (d) None of the above ( )

3. How many bits are required in operation code of an instruction to perform 30 distinct operations?

(a) 15 ( ) *(b)* 5 ( )

(c) 30 ( ) *(d)* 6 ( )

4. Which register has only 8 numbers of bits?

(a) TR ( ) *(b)* INPR ( )

(c) DR ( ) *(d)* AR ( )

5. What is the content of stack pointer (SP)?

(a) Address of the top element in the stack ( )

(b) Address of current instruction ( )

(c) Address of next instruction ( )

(d) None of the above ( )

6. The addressing mode, where you directly specify the operand value is

(a) immediate ( ) *(b)* direct ( )

(c) definite ( ) *(d)* relative ( )

7. The registers of the DMA controller are

(a) 64 bits ( ) *(b)* 24 bits ( )

(c) 32 bits ( ) *(d)* 16 bits ( )

8. In memory mapped I/O

(a) the I/O devices have separate address space ( )

(b) the memory and I/O devices have an associated address space ( )

(c) a part of the memory is specifically set aside for the I/O operation ( )

(d) the I/O devices and the memory share the same address space ( )

9. The memory that communicates directly with CPU is called

   (a) auxiliary memory ( )

   (b) USB storage ( )

   (c) main memory ( )

   (d) microprogram memory ( )

10. Which of the following refers to the associative memory?

   (a) The address of the data is generated by the CPU ( )

   (b) There is no need for an address, i.e., the data used as an address ( )

   (c) The address of the data is supplied by the users ( )

   (d) More than one of the above ( )

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

1. Bus is dedicated transmission media.

   (T / F)

2. Fetch cycle is executed after execution cycle.

   (T / F)

3. PUSH is a zero-address instruction.

   (T / F)

4. Handshaking is simple timing mechanism.

   (T / F)

5. Virtual memory allows for very effective multiprogramming.

   (T / F)

SECTION—II

(*Marks* : 10)

III. Answer the following questions : 2×5=10

1. What is the computer instruction?
2. What is the difference between counters and registers?
3. What are peripheral devices? Give examples.
4. What is auxiliary memory?
5. What is stack organization?

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

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

1. *(a)* What is register transfer? Explain the operation of three-state buffer and show its use in design of a common bus. 10

OR

(b) What is micro-operation? Explain the four types of micro-operation. 2+8=10

2. *(a)* Explain all the phases of instruction cycles. 10

OR

(b) Briefly explain common bus system of basic computer with a neat diagram. 10

3. *(a)* What is stack? Give the organization of register stack with all necessary elements and explain the working of PUSH and POP operations. 10

OR

(b) Explain the different types of addressing mode. 10

4. *(a)* What is DMA? Explain in brief DMA controller by giving a suitable block diagram. 2+8=10

OR

(b) Discuss the different techniques used for interfacing I/O units with the process. 10

5. *(a)* Explain direct mapping of cache memory system. 10

OR

(b) What is virtual memory? Explain memory hierarchy in detail. 3+7=10

★ ★ ★