Professional Course Examination, November/December 2019

(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Course : BCA–305

(Computer Organization and Architecture)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 15)

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

1. The output of a NAND gate is low

(a) only when all the inputs are low ( )

(b) only when all the inputs are high ( )

(c) only when at least one input is high ( )

(d) only when at least one input is low ( )

2. Instruction to increment and skip if zero is

(a) INC ( ) *(b)* SKI ( )

(c) ISZ ( ) *(d)* None of the above ( )

3. Assembler is a program that
   (a) places programs into memory and prepares them for execution ( )
   (b) automates the translation of assembly language into machine language ( )
   (c) accepts a program in a high-level language and produces an object program ( )
   (d) appears to execute a resource as if it were machine language ( )

4. Stack organization employs
   (a) LIFO ( ) (b) FIFO ( )
   (c) LILO ( ) (d) FILO ( )

5. A memory device in which location is identified by its contents than by name is known as
   (a) buffer ( ) (b) magnetic tape ( )
   (c) associative storage ( ) (d) punch card ( )

6. The number of bits required to address a memory of 512 byte is
   (a) 9 ( ) (b) 10 ( )
   (c) 11 ( ) (d) 12 ( )

7. Which of the following memory units stores bootstrap loader?
   (a) RAM ( ) (b) ROM ( )
   (c) Cache memory ( ) (d) Virtual memory ( )

8. Which of the following registers has 12 bits?
   (a) AR ( ) (b) IR ( )
   (c) TR ( ) (d) INPR ( )

9. Which of the following is not an auxiliary memory?
   (a) CD-ROM ( ) (b) Magnetic tapes ( )
   (c) ROM ( ) (d) Optical disks ( )

10. The DMA differs from the interrupt mode by
   (a) the involvement of the processor for the operation ( )
   (b) the method of accessing the I/O devices ( )
   (c) the amount of data transfer possible ( )
   (d) None of the above ( )

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

1. RISC has variable length of instruction format.
   (T / F)
2. Control bus is a group of lines used for the purpose of data flow.
   (T / F)
3. Computer can understand only machine language.
   (T / F)
4. Hardwired control is faster than microprogrammed control.
   (T / F)
5. Interrupt is used to break the ongoing process of CPU.
   (T / F)

SECTION—B

(*Marks* : 10)

Answer the following questions : 2×5=10

1. Define half-adder and full-adder.
2. Write the difference between compiler and assembler.
3. What do you mean by program counter?
4. What is DMA?
5. Write the function of virtual memory.

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* What is computer instruction? Explain any eight basic computer instructions. 5

   (b) Design a 4-bit adder/subtractor circuit using full adders. 5

OR

(c) What is arithmetic microoperation? Describe the symbolic designation of microoperations. 5

(d) Design common bus system for four registers using 4×1 multiplexers and explain how it works. 5

2. (a) Explain the major components of CPU with the bus system. 5

(b) Explain the execution of microinstructions with a neat diagram. 5

OR

(c) What is register transfer language? Briefly write the function of different types of basic computer registers. 5

(d) Explain four phases of an instruction cycle. 5

3. (a) Write shortly about addressing modes. 5

(b) What are the three basic types of data manipulation instructions? Give a list of shift instructions. 5

OR

(c) What is cache memory? How can its performance be increased? 5

(d) Write a short note on DMA. 5

4. (a) What are the needs for input-output interface? 5

(b) What is IOP? Write a block diagram of a computer with I/O processor. 5

OR

(c) Explain the connection of I/O bus to input-output devices using a diagram. 5

(d) Discuss three modes of transfer to and from peripherals. 5

5. (a) What is memory hierarchy? Write its significance. 5

(b) Highlight the major differences between a direct-mapped cache with a set-associative cache. 5

OR

(c) What is main memory? Explain the function of RAM and ROM. 6

(d) Write a short note on virtual memory. 4

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