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(3rd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA–305

(Computer Organisation and Architecture)

(New Course)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

*The figures in the margin indicate full marks
for the questions*

1. (a) Design a Bus system for five registers using a multiplexer. Also explain the diagram.   5

 (b) Explain the four categories of micro-operations encountered in a digital computer. Give one example each.   5

Or

 (c) Design a 4-bit binary adder-subtractor by explaining how it works.   5

(**2**)

(d) Consider the 8-bit register content 10101010. What will be the content of the register after performing the following shift operations? 5

  (i) 2 logical shift left

  (ii) 3 logical shift right

  (iii) 1 circular shift right

  (iv) 3 arithmetic shift left

  (v) 1 logical shift left followed by 1 circular shift right

2. (a) Explain the three basic computer instruction formats by giving suitable example. 4

(b) Write and explain the flowchart for the second pass of an assembler. 6

Or

(c) What is machine and assembly language? Mention its relative advantages and disadvantages. 5

(d) Write the four phases of an instruction cycle. Draw the diagram for the control unit of the basic computer. 5

3. (a) What is a CPU? Explain one method by giving a suitable diagram how stack can be implemented in a digital computer. 5

(b) Explain any five addressing modes of an instruction by giving a suitable example. 5

Or

(c) Explain zero, one, two and three address instructions by giving a suitable example.   5

(d) Differentiate between RISC and CISC.   5

4. (a) Explain the four types of commands that an interface of peripheral devices received.   4

  (b) What is DMA? Write the block diagram of a DMA controller.   6

Or

  (c) Explain strobe pulse method and handshaking methods of Asynchronous Data Transfer by giving a suitable diagram.   8

  (d) What are the three modes on data transfer to and from peripheral devices?   2

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

  (b) Write and explain different types of memory in a digital computer system.   5

Or

(c) Write a short note on magnetic disk.   4

(d) What are different mapping methods of a cache memory? Explain the address mapping method using paging technique.   6

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2015

(3rd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA–305

(**Computer Organisation and Architecture**)

(New Course)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

A. Tick (✓) the correct answer in the brackets provided :

1×10=10

1. The symbolic notation used to describe the micro-operation transfers among registers is called a

   (a) microoperation transfer ( )

   (b) register transfer language ( )

   (c) high-level language ( )

   (d) interrupt ( )

2. The microoperations that specify binary operations for strings of bits stored in register is called

   (a) shift microoperation ( )

   (b) logic microoperation ( )

   (c) arithmetic microoperation ( )

   (d) register microoperation ( )

3. A set of instructions that specifies the operations, operands, and the sequence by which processing has to occur is called

   (a) opcode ( )

   (b) computer organisation ( )

   (c) arithmetic operation ( )

   (d) program ( )

4. 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) branch instruction ( )

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5. The collection of all status bit conditions in the CPU is called

    (a) program status word   (   )

    (b) processor status word   (   )

    (c) program stored word   (   )

    (d) processor stored word   (   )

6. The expression $(A + B) * [C * (D + E) + F]$ in reverse polish notation is

    (a) AB + DE + C * F + *   (   )

    (b) AB + DE + C *F * +   (   )

    (c) AB *DE * + CF *   (   )

    (d) * + F *C + DE + AB   (   )

7. When the DMA takes control of the bus system, it communicates directly with the

    (a) processor   (   )

    (b) cache   (   )

    (c) memory   (   )

    (d) I/O processor   (   )

8. If the registers in interface share a common clock with the CPU register, the transfer between the two units is said to be

    (a) parallel   ( )

    (b) serial   ( )

    (c) synchronous   ( )

    (d) asynchronous   ( )

9. Memory devices that provide backup storage are called

    (a) main memory   ( )

    (b) cache memory   ( )

    (c) tape memory   ( )

    (d) auxiliary memory   ( )

10. The transformation of data from main memory to cache memory is referred to as

    (a) memory transformation   ( )

    (b) cache ratio   ( )

    (c) locality of reference   ( )

    (d) memory mapping   ( )

II. Indicate *True (T)* or *False (F)* by a Tick (✓) mark :

1×5=5

1. In a memory hierarchy system, programs and data are first stored in cache memory.

(T / F)

2. The program that translate high-level language program to binary code is called assembler.

(T / F)

3. The transfer of new information to be stored into the main memory is called a write operation.

(T / F)

4. In an instruction format the opcode field designates a memory address or a processor register.

(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. Distinguish between external interrupts and internal interrupts.

2. What is a virtual memory?

3. Write the main differences between isolated I/O and memory-mapped I/O.

4. What are the different tables used by an assembler during its first pass and second pass?

5. Differentiate between logical shift and arithmetic shift microoperation.

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