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**MCA**

Paper : 3.3

**( Computer Organization and Architecture )**

*Full Marks : 100*

*Time : 3 hours*

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

1. Choose the correct option among the following : 1×10=10
- (a) The shifting of data from a bus to one of the targeted registers is with the help of the load control of that
- (i) bus
  - (ii) protocol
  - (iii) register
  - (iv) None of the above
- (b) A shared communication path consisting of one or more connection lines is known as a bus and transfer of data through this bus is known as
- (i) control bus
  - (ii) data bus
  - (iii) bus transfer
  - (iv) hypertext transfer protocol

- (c) The component of the computer that performs the bulk of data processing operations is known as
- (i) ALU
  - (ii) CPU
  - (iii) monitor
  - (iv) bus
- (d) The group of binary bits to perform a specified operation is known as
- (i) control word
  - (ii) output register
  - (iii) transfer bus
  - (iv) None of the above
- (e) The technique for specifying the address of operands is known as
- (i) instruction cycle
  - (ii) logging
  - (iii) addressing mode
  - (iv) complement accumulator
- (f) An electronic circuitry that allows data to be stored and retrieved when required, is known as
- (i) CPU
  - (ii) memory
  - (iii) ALU
  - (iv) bus topology

(g) The memory hierarchy can be divided into

- (i) three levels
- (ii) four levels
- (iii) five levels
- (iv) six levels

(h) The memory system in the computer that is easily read from and written to by the processor is the

- (i) RAM
- (ii) ROM
- (iii) ALU
- (iv) CPU

(i) Data is written into a ROM at the time of

- (i) execution
- (ii) manufacture
- (iii) distribution
- (iv) marketing

(j) When a word is written on an associative memory, there is no

- (i) space
- (ii) data
- (iii) address
- (iv) None of the above

2. Fill up the blanks :

1×10=10

- (a) The speed of the bus is affected by its length as well as by the number of — sharing it.
- (b) A bidirectional bus for carrying data between two units is called a —.
- (c) A — is an ordered collection of items which permits the insertion or deletion of an item to occur at only one end.
- (d) The format in which the — is specified is known as instruction format.
- (e) Data transfer instructions — data from one location to another without changing the data content.
- (f) A subroutine is a self-contained series of — that performs a given computing task.
- (g) A static RAM is made from an array —.
- (h) A floppy disk is also known as —.
- (i) A procedure that permits the running of processes that may not be entirely in memory is called a — memory.
- (j) Interrupts are — used to stop current execution and start new execution.

3. State *True* or *False* : 1×10=10

- (a) The ALU unit along with the control unit is collectively known as the Input/Output unit.
- (b) The 16-bit common bus receives information from sixteen registers and the memory unit.
- (c) Op-code is a data field that specifies the particular operation to be performed by the instruction.
- (d) The time required to complete one instruction is called execution time.
- (e) When the operator is placed before two operands as  $+xy$ , then the notation is termed as postfix notation or a reverse Polish notation.
- (f) Data manipulation instructions are those instructions that perform arithmetic, shift or logic operations to manipulate data.
- (g) The main memory unit does not directly interact with the CPU.
- (h) The cache usually stores the program segments currently being executed in the CPU.
- (i) All information stored in the RAM is lost when the power supply is switched off.
- (j) The address space is broken into groups of equal size known as blocks and the memory space is broken into groups of same size known as page.

4. Match Column—A with Column—B :  $1 \times 10 = 10$ 

Column—A	Column—B
(a) The result used of an ALU operation is automatically stored in the	(i) pop
(b) The register used for holding temporary data generated during processing is	(ii) infix notation
(c) The insertion operation is known as push and the deletion operation is known as	(iii) all data manipulation
(d) A stack can be organized by a finite number	(iv) many times temporary register
(e) The plus operator when placed in between the two operands $x$ and $y$ is known as	(v) instruction
(f) The reverse Polish notation is best suited for	(vi) accumulator
(g) Computers with stack organization have push and pop instructions and require an	(vii) address field
(h) A one-address instruction uses an accumulator (AC) register for	(viii) registers
(i) During program execution, a subroutine can be called to perform its operations	(ix) stack manipulation
(j) In absolute addressing mode the operand is specified in the	(x) control word data content

5. Answer the following :

5×6=30

- (a) What is an instruction? What is an instruction cycle?
- (b) Explain register stack with the help of a diagram.
- (c) Explain the two page-replacement algorithms.
- (d) What is mapping? Explain direct mapping with the help of a diagram.
- (e) Explain the organization of a RAM chip with the help of a block diagram.
- (f) Explain the features of static RAM and dynamic RAM.

6. What is an addressing mode? Discuss different types of addressing modes.

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Or

What is an interrupt? Explain the three modes of data transfer between I/O device and memory.

7. What is an instruction format? Explain the three types of CPU organization. 15

*Or*

What is DMA? Explain the steps involved in transferring data through DMAC with the help of a diagram.

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