Total No. of printed pages = 4

BCA 171301

Roll No. of candidate

B.C.A. 3rd Semester End-Term Examination

COMPUTER ARCHITECTURE AND ORGANISATION

(New Regulation)

Full Marks – 70   Time – Three hours

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

Answer question No. 1 and any *four* from the rest.

1.   Answer the following (MCQ/ Fill in the blanks) : $(10 \times 1 = 10)$

   (i)   In computers, subtraction is generally carried out by

   (a)   9's compliment   (b)   10's compliment

   (c)   1's compliment   (d)   2's compliment

   (ii) What characteristics of RAM memory makes it not suitable for permanent storage?

   (a)   Too slow   (b)   Unreliable

   (c)   It is volatile   (d)   Too bulky

   (iii) The circuit used to store one bit of data is known as

   (a)   Register   (b)   Encoder

   (c)   Decoder   (d)   Flip Flop

   (iv) The operation executed on data stored in register is called

   (a)   Macro-operation   (b)   Micro-operation

   (c)   Bit-operation   (d)   Byte-operation

   (v)   The DMA transfers are performed by a control circuit called as

   (a)   Device interface   (b)   DMA controller

   (c)   Data controller   (d)   Overlooker

[Turn over

(vi) The number unsuccessful accesses to memory stated as a fraction is called as —————

    (a) Hit rate   (b) Miss rate

    (c) Success rate   (d) Access rate

(vii) An address in main memory is called

    (a) Physical address   (b) Logical address

    (c) Memory address   (d) Word address

(viii) A computer uses a physical memory of size 64 bytes and word size is 4 bytes. How many bits are required to represent one block? (Assume 1byte = 1 word)

    (a) 16   (b) 2

    (c) 4   (d) None of these

(ix) A nibble is a group of _____ bits

    (a) 16   (b) 4

    (c) 8   (d) 2

(x) PC (Program counter) is also called

    (a) instruction pointer   (b) Memory pointer

    (c) Data counter   (d) File pointer

2. (a) A computer uses a memory unit with 256K words of 32 bits each. A binary instruction code is stored in one word of memory. The instruction has four parts: an indirect bit, an operation code, a register code part to specify one of 64 registers, and an address part.   (3+3+3=9)

    (i) How many bits are there in the operation code, the register code part and the address part?

    (ii) Draw the instruction word format and indicate the number of bits in each part.

    (iii) How many bits are there in the data and address inputs of memory?

  (b) Convert the following   (3+3=6)

    (i) $(56)_8$ to hexadecimal

    (ii) $(56)_8$ to decimal

3. (a) What is the need of addressing modes in computer system? Explain direct and indirect addressing mode. (5)

(b) What is an instruction cycle? Explain the phases involved in instructions cycle. (2+3=5)

(c) What is an interrupt? Explain their types in detail. (2+3=5)

4. (a) Explain the single bus organization in details with necessary diagram. (5)

(b) What is cache memory? Why it is required though we have main memory and virtual memory in computer system. (1+4=5)

(c) Briefly explain the difference between asynchronous and synchronous data transfer? (5)

5. (a) Write short notes: (Any *two*) (2 × 5 = 10)

   (i) RISC and CISC

   (ii) Priority Interrupt

   (iii) Input-output Processor (IOP).

(b) What is Hardwired control? Explain the characteristics of it in detail. (2+3=5)

6. (a) What is Associative memory? Discuss direct mapping techniques in detail with its advantages and disadvantages in comparison to associative mapping. (1+4=5)

(b) What is DMA? Differentiate between DMA and interrupt-initiated mode of data transfer? (2+3=5)

(c) Briefly explain cycle stealing and burst transfer mode in detail. (5)

BCA 171301 3

7. (a) What is microcontroller? Explain the advantage and disadvantage of it in detail? (2+3=5)

(b) From the following figure, find out the effective address for the following. Consider PC=200, R1=400, XR=100 (PC= Program counter, R1= processor register, XR= index register) (10)

Address	Memory
200	Load to AC mode
201	Address = 500
202	Next instruction
399	450
400	700
500	800
600	900
702	325
800	300

(i) Direct mode

(ii) Indirect mode

(iii) Register mode .

(iv) Immediate mode

(v) Relative mode

(vi) Register indirect mode

_____