BCA(I) — COM / I /
7 / X / H

2010

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

(Objective Type Questions)
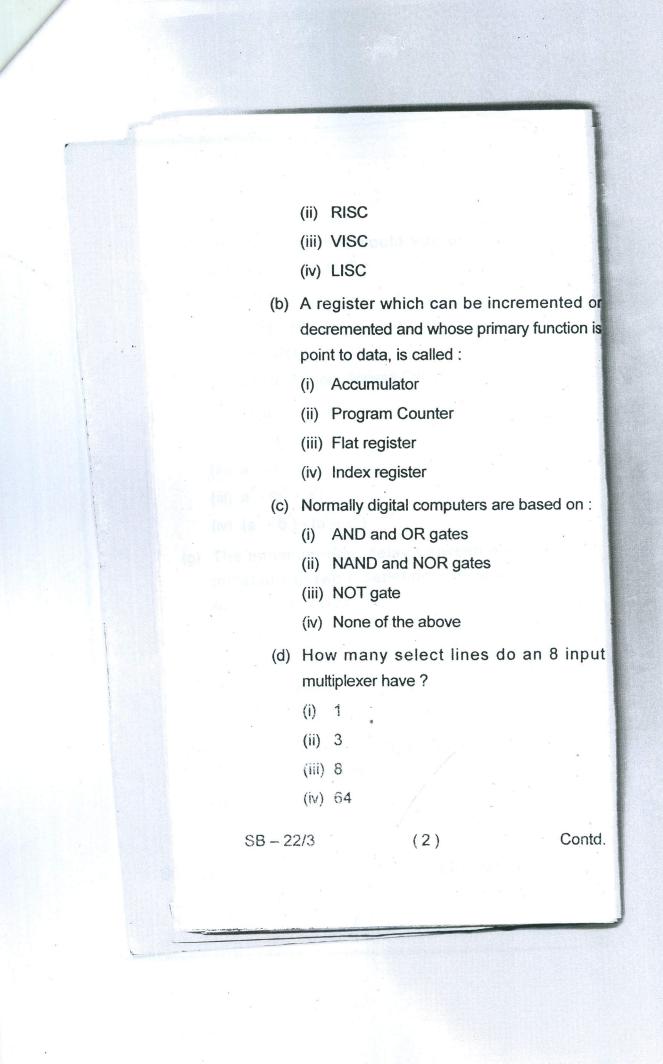
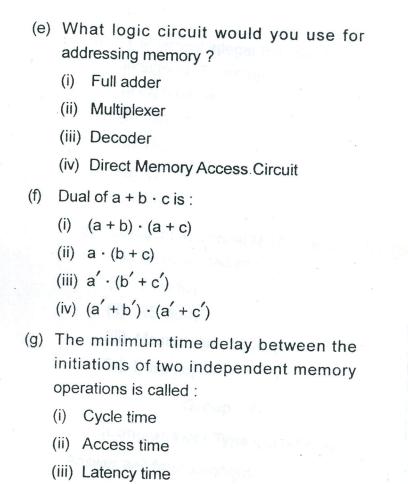Answer **all** questions.

1. Choose the correct answer of the following :

                                    2×10 = 20

    (a) _____ is a type of processor architecture that utilizes a small, highly optimized set of instructions.

        (i) CISC

(ii) RISC

(iii) VISC

(iv) LISC

(b) A register which can be incremented or decremented and whose primary function is point to data, is called :

(i) Accumulator

(ii) Program Counter

(iii) Flat register

(iv) Index register

(c) Normally digital computers are based on :

(i) AND and OR gates

(ii) NAND and NOR gates

(iii) NOT gate

(iv) None of the above

(d) How many select lines do an 8 input multiplexer have ?

(i) 1

(ii) 3

(iii) 8

(iv) 64

(e) What logic circuit would you use for addressing memory ?

(i) Full adder

(ii) Multiplexer

(iii) Decoder

(iv) Direct Memory Access Circuit

(f) Dual of $a + b \cdot c$ is :

(i) $(a + b) \cdot (a + c)$

(ii) $a \cdot (b + c)$

(iii) $a' \cdot (b' + c')$

(iv) $(a' + b') \cdot (a' + c')$

(g) The minimum time delay between the initiations of two independent memory operations is called :

(i) Cycle time

(ii) Access time

(iii) Latency time

(iv) None of the above

(h) The truth table of n variables has _____ minterms.

(i) n^2

(ii) $(n - 1)^2$

(iii) 2n

(iv) 2n – 1

(i) The largest integer that can be represented in signed–2's complement representation using n bits is :

(i) 2n – 1

(ii) 2n

(iii) 2n – 1^{-1}

(iv) 2n + 1

(j) Using an additional NOT gate, a JK flip-flop can be converted into :

(i) T flip-flop

(ii) RS flip-flop

(iii) Master Slave flip-flop

(iv) D flip-flop

Group – B

(Long-answer Type Questions)

Answer any **four** questions :

2. (a) What is binary counter ? Why T and JK flip-flops are employed in counter circuit ? Give the circuit diagram of 4 bit synchronous binary counter.   7

(b) What is multiplexer ? What are the functions of multiplexer inputs ? Draw logic diagram of 4 to 1 line multiplexer giving function table also.   8

3. (a) Draw and explain a 4 bit adder-subtractor circuit.   6

(b) Explain the various registers and their functions used in basic computer.   9

4. (a) Find out the simplified equation for the function f(a, b, c) using sum of products from the following truth table. Also show the design of the circuit using only NAND gates.   10

a	b	c	F
0	0	0	1
0	1	0	1
0	1	0	0
0	0	1	0
1	1	0	1
1	0	1	0
1	1	0	0
1	1	1	1

(b) What is the difference between zero address, one-address and two-address instructions ? Illustrate with the help of examples.

5. (a) Consider a four variable Boolean function

$$F = \Sigma (0, 4, 6, 7, 8, 10, 11, 15).$$

Minimize this function using K map and realize it using gates.

(b) Why NAND gate is called a universal gate ? Justify your answer.   7

6. (a) Compare RISC and CISC architecture in brief. Also discuss the advantages and disadvantages of each.   8

(b) What do you mean by pulse-triggered flip-flops in the design of synchronous counter ?

7

7. (a) What is the difference between isolated I/O and memory mapped I/O ? What are the advantages and disadvantages of each ?   8

(b) Explain the various types of mapping procedures used by the Cache memory.   7

8. (a) What is the role of an interrupt controller in a computer ?   7

   (b) Describe instruction format. Also explain any two types of instruction cycles in detail.   8

9. (a) What is Interrupt ? Explain, in brief, the different types of interrupt with example.   7

   (b) What is address mode ? Differentiate between indexed and base-indexed addressing mode.   8

10. (a) Briefly describe the working of DMA.   · 7

   (b) What is I/O Module ? Define its types and functions.   8

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