

6. Obtain the simplified Boolean functions of the full-adder in sum of products form and draw the logic diagram using NAND gates.
7. Explain the following :
- (a) Virtual Memory
 - (b) DMA
 - (c) Register Memory
 - (d) Index-Memory
8. Why does DMA have priority over the CPU ?
When both request a memory transfer ?



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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 from the following :
- $2 \times 10 = 20$
- (a) The binary addition (1001 + 100) equals to:
 - (i) 1011 with carry 1
 - (ii) 1010 with carry 1
 - (iii) 1010 with carry 0
 - (iv) None of these

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- (b) Odd one out :
- (i) Cache
 - (ii) Main memory
 - (iii) Buffers
 - (iv) Secondary memory
- (c) species the address of the next instruction to be executed.
- (i) IR
 - (ii) PC
 - (iii) MAR
 - (iv) MBR
- (d) The decimal value of (101011.01) is :
- (i) 51.75
 - (ii) 55.75
 - (iii) 57.25
 - (iv) None of these
- (e) Negative numbers are stored in the system in the form of :
- (i) 1's complement

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(2)

Contd.

- (ii) 2's complement
 - (iii) Both (i) and (ii)
 - (iv) None of these
- (f) Main memory is a collection of :
- (i) Instructions
 - (ii) Data
 - (iii) Instruction and data
 - (iv) Address
- (g) The most common system security method is :
- (i) Password
 - (ii) Keypad system
 - (iii) Mantrap
 - (iv) None of these
- (h) _____ is a slowest storage memory to copy instructions and operands.
- (i) Ram
 - (ii) Rom
 - (iii) Cache
 - (iv) HDD

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(3)

(Turn over)

(i) _____ establishes the communication among processors, main memory and I/O modules.

- (i) Address bus
- (ii) Data bus
- (iii) Control bus
- (iv) System bus

(j) _____ is a type of processor architecture that utilizes highly optimixed set of instructions :

- (i) CISC
- (ii) RISC
- (iii) VISC
- (iv) LISC

Group – B
(Long-answer Type Questions)

Answer any four questions of the following :
15x4 = 60

2. (a) Verify the two De-Morgan's theorems by means of truth tables.

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(b) Simplify the following Boolean functions algebraically :

- (i) $x^2 + xyz'$
- (ii) $(A + B)' (A' + B)'$
- (iii) $A + A'B + A'B'$
- (iv) $(x + y) (x + y')$
- (v) $xy + xy'$

3. (a) Show that a JK flip-flop can be converted to a D – Flip-Flop with an inverter between the J and K inputs.

(b) Explain master-slave Flip-flop using J-K Flip-flop.

4. Why NAND gate is called a universal gate? Justify your answer construct logical equivalence of AND and OR using NOR-gate.

5. (a) Write the decimal equivalent of $(11010.111)_2$, $(736.5)_8$ and $(3FA.8)_{16}$

(b) Convert the following decimal numbers to binary :
12.0625, 10^4 , 673.23 and 1998

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