

MARCH 2009, DIGITAL ELECTRONICS, PAPER 2

Ques 1 (A): Select correct alternative and rewrite the following sub question – (4 Marks)

- a) The BCD equivalent of decimal 15 is _____.
- (i) 1111 (ii) 0001 0101 (iii) 1000 0101 (iv) 10000
- b) In _____ gate when one of the input is low, output is high.
- (i) NAND (ii) NOR (iii) EX-OR (iv) EX-NOR
- c) In a D flip-flop _____ input is called synchronous input of the flip-flop.
- (i) Preset (ii) Clear (iii) D (iv) Reset
- d) In a 4-bit weighted resistor DAC, the LSB has a weight of _____
- (i) 1/16 (ii) ¼ (iii) 1/8 (iv) 1/15

Ques 1 (B): Attempt any TWO of the following – (6 Marks)

- a) Explain, why NAND/NOR gate is called universal building block? Draw Basic gates using NOR gates.
- b) Write a note on 4-bit Binary Adder.
- c) With the help of logic diagram and waveform, explain the working of 3-bit ripple down counter.

Ques 2 (A): Attempt any TWO of the following – (6 Marks)

- a) Draw basic circuit diagram of TTL NAND gate and explain its working.
- b) State any 4 characteristics of digital ICs and explain any two of them.
- c) Write a note on BCD to 7-segment decoder/drivers. Explain the function of the following pins: blanking input and lamp test.

Ques 2 (B): Attempt any ONE of the following – (4 Marks)

- a) Write a note on Floppy Disk and Hard Disk.
- b) Draw basic block diagram of a Computer and explain the function of each block.

Ques 3 (A): Attempt any TWO of the following – (6 Marks)

- a) What is an Encoder? Draw the diagram of decimal to BCD encoder using OR gates and explain its working.
- b) What is Multiplexer? Design a 8:1 multiplexer using two 4:1 multiplexer.
- c) Explain the working of 1:4 Demultiplexer using a logic diagram.

Ques 3 (B): Attempt any ONE of the following – (4 Marks)

- a) Explain Hex-dabble Method with suitable example.
- b) What do you mean by 2's complement of a number? Explain binary subtraction by 2's complement method with suitable example.

Ques 4 (A): Attempt any TWO of the following – (6 Marks)

- a) Convert the following: (i) $(9A7)_{16} = (?)_{10}$ ii) $(456)_{16} = (?)_{BCD}$
- b) Write a note on BCD Code. State its advantages and disadvantages.
- c) Draw the logic diagram of edge triggered D flip-flop with preset and clear facility. Explain preset and clear facility in it.

Ques 4 (B): Attempt any ONE of the following – (4 Marks)

- With the help of a logic diagram and waveform, explain the working of decade counter.
- What is a Decoder? Explain the working of 1-of-10 decoder using suitable logic diagram.

Ques 5 (A): Attempt any TWO of the following – (6 Marks)

- Explain the working of counter type analog to digital converter with neat labeled diagram.
- State the disadvantage of J-K flip-flop. How it can be removed? Explain.
- Implement the following expression using multiplexer and explain. $f(A,B,C,D) = m(1,2,5,7,10,13)$

Ques 5 (B): Attempt any ONE of the following – (4 Marks)

- State and prove De Morgan's Theorems. Draw logic diagrams.
- Define Ex-OR Gate. Explain any two applications of Ex-OR Gate.

OR

Ques 5 (A): Attempt any TWO of the following – (6 Marks)

- Draw the circuit diagram of clocked R-S flip-flop. Explain its working.
- In a 4-bit R-2R Ladder Digital to Analog Converter, find
 - Full Scale Output Voltage.
 - Voltage due to one LSB change
 - Output voltage for 1010 input. Given logic-0 = 0V and logic-1 = +15V
- Explain the working of Ring Counter with truth table and waveform.

Ques 5 (B): Attempt any ONE of the following – (4 Marks)

- Explain the working of Weighted Resistor Digital to Analog Converter. State its disadvantages.
- Compare TTL and CMOS logic families.

