

MARCH 2007, DIGITAL ELECTRONICS, PAPER 2

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

- a) $(11)_2 + (11)_2 + (11)_2$ _____
- (i) $(111)_2$ (ii) $(1011)_2$ (iii) $(1111)_2$ (iv) none
- b) In a negative logic system, the more positive of the two voltage levels is indicated by _____
- (i) 1 (ii) 0 (iii) 2 (iv) None of the above
- c) In a priority encoder, if decimal inputs 3 and 6 are activated at same time, the BCD output corresponds to _____
- (i) 6 (ii) 3 (iii) 6 and 3 alternately (iv) None of the
- d) _____ is a sequential access secondary storage.
- (i) Floppy disk (ii) Hard disk (iii) Magnetic tape (iv) None of the above

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

- a) Subtract the following by the 2s complement method :
- i) $(111011)_2 - (101)_2$ ii) $(11)_2 - (11111)_2$
- b) Construct 4:1 multiplexer using 2 : 1 multiplexers. Also give the final truth table.
- c) What is a Down counter? Draw the block diagram of a 4-bit down counter (ripple type) and give its truth table.

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

- a) Simplify the following expression using Boolean Laws :
- i) $Y=(A+B) (A+C)$ ii) $Y=AB+A(B+C) + B(B+C)$
- b) Explain the terms: figure of merit, noise immunity for a TTL. Logic family.
- c) Explain the working of weighted, resistor D/A converter with neat circuit diagram.

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

- a) With neat circuit diagram, explain the working of a BCD-to-7 segment decoder.
- b) Explain the working of a serial-in, parallel-out type of shift register with neat diagram.

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

- a) Explain the method of converting a binary number into decimal with one example.
- b) Explain how NOR gates can be used to construct the basic gates.
- c) What is a Demultiplexer? Explain its working with the help of a rotary switch.

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

- a) Compare series and parallel counters. (any four points).
- b) Explain the working of R-2R ladder type D/A converter with neat diagram.

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

- a) What are open collector TTL gates? Draw the circuit of an open collector TTL NAND gate.
- b) Explain the action of present and clear terminals of a flip-flop. With neat logic diagram.
- c) Explain the need of A/D and D/A converter.

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

- a) Draw the logic diagram of a full adder and explain its working with truth table.
- b) Implement the following multi-output combinational logic circuit using a 3 to 8 line decoder
- $F_1 = m(0, 2, 4, 5)$ $F_2 = m(1, 4, 6, 7)$

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

(6 Marks)

- a) Perform the following :
 - i) $(10111.101)_2 = (?)_{16}$
 - ii) $(91)_{10} = (?)_2$
 - iii) $(594)_{10} = (?)_{BCD}$.
- b) With neat logic diagram, explain the working of a clocked DFF.
- c) With neat block diagram, explain the working of counter type of A/D converter.

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

(4 Marks)

- a) State and prove De Morgan's theorems.
- b) Draw a neat block diagram of a digital computer and explain the function of each block.

OR

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

(6 Marks)

- a) With neat circuit diagram and truth table, explain the working of a CMOS NOT gate.
- b) State six specifications of any PC.
- c) For given four serially cascaded T flip-flops, if input to the first flip-flop is 120 kHz of squared wave, what will be the output frequency of the final flip-flop?

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

(4 Marks)

- a) Explain the method of converting a hexadecimal number into decimal with two examples.
- b) With the help of neat diagram and truth table explain the working of BCD to decimal decoder.
