

OCTOBER 2007, DIGITAL ELECTRONICS, PAPER 2

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

- a) The number that will come immediately after (FF)₁₆ is _____.
- (i) (100)₁₆ (ii) (FF0)₁₆ (iii) (1FF)₁₆ (iv) _____
- b) For a two input EX_OR gate, one of the input is kept high. (1), the output EX-OR gate is _____
- (i) Same as the other input (ii) Complement of the other input (iii) High (iv) _____
- c) In a T flip-flop, the output frequency is _____
- (i) Same as input frequency (ii) One half of its input frequency (iii) Double of its input frequency (iv) _____
- d) If full scale output voltage of a 4-bit weighted type DAC is 5 volts, its resolution is _____ volts.
- (i) 0.33 (ii) 0.67 (iii) 1.33 (iv) _____

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

- a) Explain the method of converting decimal fraction into binary and hexadecimal fraction.
- b) Explain subtraction of binary numbers by 1's complement method for the given binary numbers $(101)_2 - (1101)_2$.
- c) Explain working of Left-shift Register using D flip-flops.

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

- a) Draw the diagram of EX-OR gate and NAND gate using NOR gate Write their truth tables.
- b) Explain positive and negative logic. Write down the appropriate voltage levels for each logic.
- c) Explain Preset and clear inputs of flip-flops with the help of appropriate diagram. Why are they called asynchronous inputs ?

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

- a) i) $(148)_{10} = (?)_{16} = (?)_2$ ii) $(0.63)_{10} = (?)_{16} = (?)_2$
- b) Write a note on BCD code. State its advantages and disadvantages.

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

- a) Explain the working of TTL inverter with totem pole output.
- b) Explain for a digital IC, noise for both levels with suitable diagram.
- c) Realize the following truth table using 4:1 multiplexer. What type of logic function will it show?

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

- a) Explain the working of 4-bit binary adder-subtractor.
- b) Simplify the following Boolean expressions using Laws of Boolean algebra :
- i) $Y=AB+AB$ ii) $Y = ABCDE + FBD$

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

- a) Explain the working of 1:4 demultiplexer using logic gates.
- b) Explain working of BCD to 7-segment decoder.
- c) What is an Encoder? Explain its working. What is a Priority Encoder?

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

- a) Classify the following devices as input and output devices and state their use. COM Plotter, optical scanner, MICR.
- b) What is a Bus ? Explain different types of buses used in digital computer.

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

- a) Explain working of Ring counter.
- b) Explain working of the flash (simultaneous) type ADC.
- c) What is modulus of a counter? How many flip-flops are required to construct each of the following
i) MOD-21 ii) MOD-105.

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

- a) Compare TTL with CMOS logic families.
- b) Explain working of successive Approximation type ADC.

OR

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

- a) What are the disadvantages of weighted resistor type ADC?
- b) Explain the concept of JK-MS flip-flop with necessary circuit diagram.
- c) Explain the working of 4:1 multiplexer using logic gates.

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

- a) Explain the working of 4-bit binary ripple counter.
- b) Realize 1:8 demultiplexer using 1:4 demultiplexer.
