OCTOBER 2008, DIGITAL ELECTRONICS, PAPER 2

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

a) The equivalent decimal number of a maximum binary number of length on byte is _____.

(i) 8 (ii) 64 (iii) 255 (iv) 256

b) The gate ideally suited for bit comparison is _____.

(i) Two input excusive NOR Gate (ii) Two input exclusive OR Gate (iii) Two input NAND Gate (iv) Two input NOR Gate.

c) _____ Flip-flop is used to avoid race around condition.

(i) RS (ii) JK (iii) JK MS (iv) None of the above

d) A/D Converter which does not use DAC is _____.

(i) Simultaneous ADC (ii) Counter type ADC (iii) Successive Approx. type ADC (iv) None of the above

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

a) Convert :
i) $(117.6\ C)_{16}$ = (_____)$_2$
ii) $(13.3125)_{10}$ = (_____)$_{16}$ = (_____)$_2$

b) Show that using Boolean Algebra and De-Morgan's theorem.
i) BC + DAC + DABC + DBC = C
ii) A(A+C)(AB+C) = 0

c) Explain the concept of clock in digital circuit; hence explain the working of D-FF.

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

a) State and prove De-Morgan's Theorem.
b) What are Derived Gates? Draw symbols and write the truth table of each.
c) Explain the working of Ring Counter.

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

a) Write a note on EBCDIC Code.
b) Subtract the following numbers using 2s complement subtraction 4
i) 1011 – 101 ii) 11.01 – 10.111 iii) 11011 – 1100 iv) 10111.1 – 10011.1

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

a) Define the following :
i) Propagation Delay ii) Noise Margin iii) Figure of merit for digital IC

b) Explain the working of CMOS NAND Gate.
c) What is a Multiplexer? Explain how a 4:1 Mux can be simulated using simple 4 way single pole switches.

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

a) Add binary numbers 1001 and 0100 using 4 bit binary adder. Explain its working.
b) What is an Ex-OR Gate? Give its symbol, truth table and explain how it is used as a parity checker.

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

a) The D_0 and D_3 inputs of a 4:1 Mux are connected to logic-0 and D_1 and D_2 inputs are connected to logic-1. Explain in brief what type of logic function the Mux will perform? When select input are given values 0 and 1 in different, combinations.
b) Explain the working of Seven Segment Decoder Driver.
c) What is an Encoder? Explain the working of decimal to BCD encoder using OR Gates.

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

a) Write notes on Floppy Disc, CD ROM.
b) Draw basic block diagram of Computer and state the function of each block.

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

a) Explain the working of Right Shift Register.
b) In 4 bit R-2R ladder DAC find Full Scale Output Voltage and Analog Output Voltage for 1010 input.
c) A clock signal of 128 kHz is applied at the input of a binary counter. Frequency at the output of last flip-flop is 2kHz. What will be the maximum number of counts that can be recorded by this counter?

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

a) Explain the working of TTL NOR Gate. What is the significance of diode in it?
b) Explain the working of Simultaneous ADC.

OR

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

a) Explain the working of Binary Weighted Resistor type DAC.
b) Explain the working of Edge Triggered T- Flip-flop.
c) What is Decoder? Explain BCD to Decimal Decoder.

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

a) Explain the working of 4 bit Binary Ripple Counter.
b) Implement the following multi-output combinational logic circuit using 4 to 16 line decoder.
$F_1 = m(1,2,4,7,8,11,12,13)$
$F_2 = m(2,3,9,11)$
$F_3 = m(10,12,13,14)$
