Total No. of Questions—**5**] [Total No. of Printed Pages—**4**

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F.Y. B.Sc. (Computer Science) EXAMINATION, 2017

ELECTRONICS

Paper-II

(ELC-102 : Principles of Digital Electronics)

(2013 PATTERN)

Time : Three Hours **Maximum Marks : 80**

N.B. **:—** (*i*) *All* questions are compulsory.

(*ii*) Neat diagrams must be drawn wherver necessary.

(*iii*) Figures to the right indicate full marks.

1. Attempt *all* of the following : [8×2=16]

(*a*) Give the radix of binary and hexadecimal number system.

(*b*) Simplify y = ABC + AB using rules of Boolean algebra.

(*c*) Find one's complement of $(9D)_{16}$.

(*d*) How many control lines are required for 256 : 1 multiplexer ?

(*e*) What do you mean by modulus of a counter ?

(*f*) Write the truth table of tristate inverter.

(*g*) Draw the logic symbol for positive edge triggered D-Flip-Flop and negative level triggered RS-Flip-Flop.

(*h*) Distinguish between decoder and demultiplexer.

P.T.O.

2. Attempt any *four* of the following : [4×4=16]

(*a*) With neat logic diagram explain the working of parity generator.

(*b*) Construct all basic gates using NOR gates.

(*c*) With neat logic diagram explain the working of full subtractor.

(*d*) Perform the following :

(*i*) $(110111)_2 \equiv (?)_{Gray}$

(*ii*) $(875)_{10} \equiv (?)_{16}$

(*e*) Convert the given SOP into standard form

$$y = A\bar{B} + \bar{C}$$

(*f*) Subtract the following using 2's complement method.

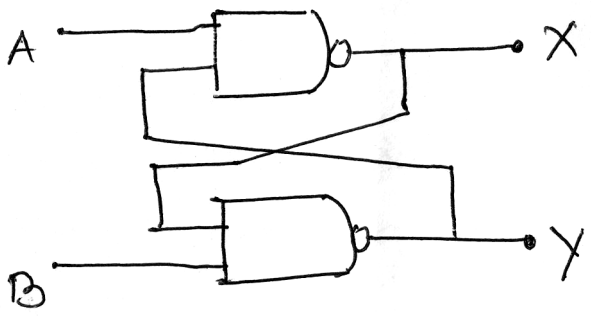
$$(10001)_2 - (11100)_2$$

Comment on the result.

3. Attempt any *four* of the following : [4×4=16]

(*a*) Draw logic diagram for decimal to BCD converter. Write the truth table for the same.

(*b*) Explain the working of the following circuit.



(*c*) Explain the working of CMOS inverter with neat diagram.

(*d*) With neat diagram explain working of 3-bit left shift serial in serial out shift register.

(*e*) Explain the working of common cathode 7-segment display. Display 1 and 5 decimal numbers using common cathode 7-segment display.

(*f*) Define the following parameters :

(*i*) Power Dissipation

(*ii*) Noise Margin

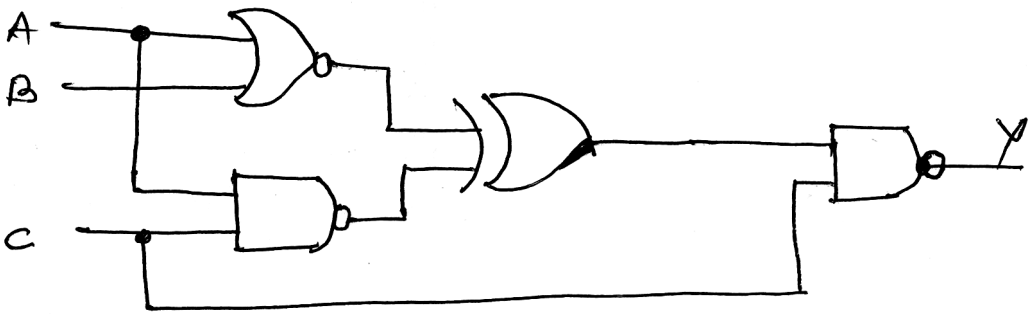
(*iii*) Switching Speed

(*iv*) Fan out.

4. Attempt any *four* of the following : [4×4=16]

(*a*) Draw logic diagram of EX-OR gate and explain its working.

(*b*) Write the truth table for the given circuit.



(*c*) Explain block diagram of ALU.

(*d*) Explain working of 4 : 1 multiplexer using NAND-NAND logic.

(*e*) Explain working of 3-bit asynchronous down counter.

(*f*) Show how IC 7490 can be connected for the following operation :

(*i*) MOD 7

(*ii*) MOD 3.

5. Attempt any *two* of the following : [2×8=16]

(A) (*a*) Convert the following :

(*i*) $(1101111)_2 \equiv (?)_{16}$

(*ii*) $(527)_{10} \equiv (?)_{\text{Excess-3}}$

(*b*) Simplify the Boolean expression using K-maps :

$y = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + AB\bar{C} + A\bar{B}\bar{C} + \bar{A}BC + ABC$

Draw simplified diagram.

(B) (*a*) Explain the working of 2 bit digital comparator.

(*b*) Implement the following logic using multiplexer :

$y = A\bar{B}C\bar{D} + ABCD + AB\bar{C}\bar{D} + ABC\bar{D} + \bar{A}\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D$

(C) (*a*) Explain working of 3×4 matrix keyboard encoder.

(*b*) What is race around condition ? Which Flip-Flop exhibits this condition ? How can race around condition be eliminated ?