Sl. No. 501 BCAT 113

No. of Printed Pages : 8

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 1103 Roll No.

BCA Examination 2018-2019

(First Semester)

DIGITAL ELECTRONICS

Time : Three Hours] *[Maximum Marks : 100*

Note :– Attempt all questions.

1. (a) Fill in the blanks of the following :

   (a) The decimal number representation of 101101.10101 is .....

   (b) The out put of J.K Flipflop when J = 1, R = 0 is .....

   (c) In SISO shift register the data is entered in serial form and output is in ..... form.

   (d) The Binary number representation of $(2\ F\ 9\ A)_{16}$ is .....

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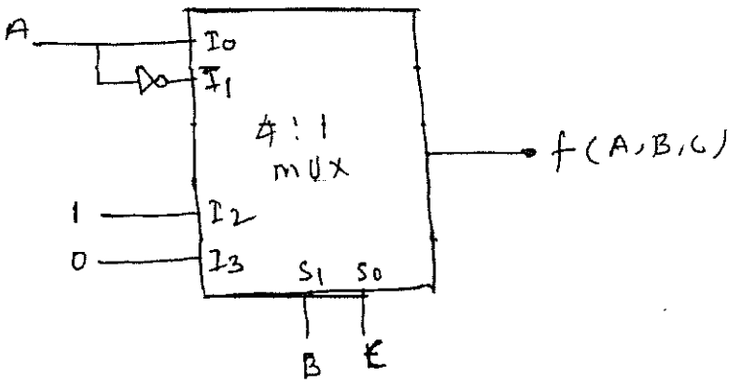
(e) ..... no. of flip flops are required to construct the MOD-8 counter.

(f) Simplify the expression for given truth table if .....

A	*B*	4
0	0	1
0	1	0
1	0	1
1	1	0

Truth table.

(g) The output of the given MUX is equal to .....



(h) Numbers of Flip-flop required ..... to design 32 bit memory (RAM)

(i) A universal register accept ..... and gives .....

(j) ..... and ..... are one and the same it is used for setting the contents of FF or memory to zero.

(b) State True or False

(a) In Bcolean Algebra
$A + BC = (A + B)(A + C)$.

(b) 7's complement of octal number 5674 is 2103.

(c) Prime implicant is a smallest possible product term of a given function.

(d) The two k-maps are said to be complemented if one k-map has 1's and another k-map has 1's on the same location.

(e) Universal logic converter is also known as multiplexer.

(f) Hamming codes are used for error detection and correction for a single bit only.

(g) SOP stands for SUM of Power.

(h) A ripple counter is an asynchronous counter

(i) The term CLEAR always means that Q = 1 and Q' = O.

(j) 1 Bit has 8 bytes.

Section-B

2. Attempt any three parts. 3×10=30

(a) Convert the following :

$(943)_{10} = (\ ?\ )_{BCD}$

$(10010)_2 = (\ ?\ )_{GRAY}$

$(3A.2F)_{16} = (\ ?\ )_{10}$

$(675.625)_{10} = (\ ?\ )_{16}$

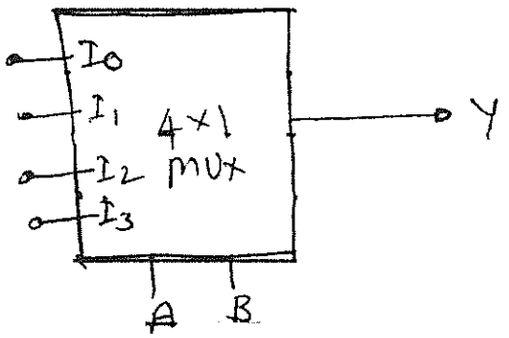
$(48)_{10} = (\ ?\ )_{Excess\text{-}3}$

(b) The addition operation 24 + 14 = 41 is true. Find the base of the number system.

(c) Construct a D Flip-flop using J.K flip-flop.

(d) Design full adder using two half adders.

(e) Implement f (A,B,C) = Σ m(0, 1, 4, 6, 7) by using the MUX given below.



Section-C

3. Attempt any two parts : 5×2=10

(a) Subtract the following using 2's complement :

(i) 110001 – 1011010

(ii) 1010101 – 11001

(b) What is Race Around condition.

(c) List the applications of shift registers.

4. Attempt any two parts. 5×2=10

(a) A 3 to 8 line decoder, with active low outputs, is used to impliment a 3 variable Boolecen function shown in the figure.

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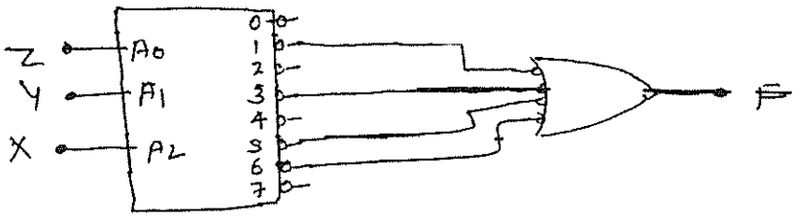

The simplified form of Boolean function, Find F (A,B,C) implemented in 'Product of SUM'

(b) Convert the following Boolean expression into canonical SOP form :

$$F = A\overline{B} + \overline{B}C + C\overline{D} + \overline{A}C$$

(c) The shift register shown in figure is initially loaded with the bit pattern 1010. Subsequently the shift register is clocked, and with each clock pulse the pattern get shifted by one bit position to the right. With each shift, the bit at the serial input is pushed to the left most position (MSB), After how many clock pulses will be the content of the shift register become 1010 again?

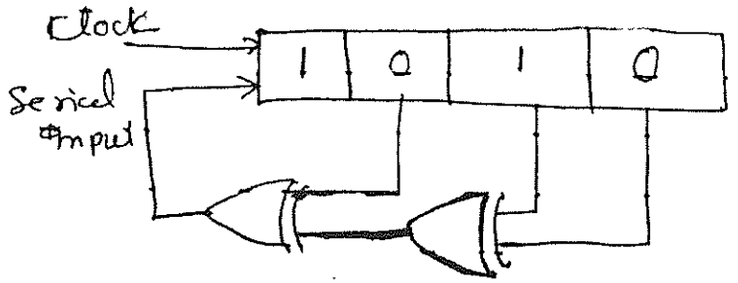

Fig.

5. Attempt any two parts. 5×2=10

(a) Write the advantage of excitation table of flip-flops. Draw the excitation table of J.K flip-flop.

(b) Design 2-Bit magnitude comparator.

(c) A bit word 1011 is to be transmitted. construct the even parity Seven bit Hamming code for the data.

6. Attempt any two parts : 5×2=10

(a) What is counter? Write the classification of counter and differentiate the synchronous and asyndronous counter.

(b) Design decimal to BCD encoder.

(c) Design a combinational circuit that accepts a 3-bit number as input and generates an output

binary number equal to square of the input number.

7. Attempt any two parts. 5×2=10

(a) Simplify a four-variable logic. function using K-Map f(A,B,C,D) = Σ m(0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14) also implement the simplified expression with AND-OR logic

(b) Write difference between combinational circuits and sequential circuits.

(c) What is hazards in digital circuits? Classify different types of hazards.

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