



Answer the following **Three** questions: (The total marks: 50)

**It is forbidden to change the name of variables or their order**

1<sup>st</sup> Question marks: 22

Choose the correct answer

1) The representation of decimal number 9 in (8,4,-2,-1) is ? marks: 1

a) 1001	b) 1111
c) 1100	d) None of the previous

2) The result of the following subtraction  $(11100011)_2 - (11110000)_2$  is..... marks: 1

a) 00010011	b) 11110011
c) 00001101	d) -00001101

3) Which of the following is considered as an example of a number in base 13? marks: 1

a) FFFF	b) ABCD <sup>11,12,13</sup>
c) 0101	d) 876E

4) Given that  $F(A, B, C) = (B'C)' + AC' + ABC$ , then the maxterms of F are ..... marks: 1

a) $\sum(0,2,3,4,6,7)$	b) $\prod(1,5)$
c) $\sum(3,4,5,6,7)$	d) $\prod(0,2,3)$

5) The simplest (optimal) form of  $F(x, y, z) = x'(y' + z') + yz + z + xz'$  is ..... marks: 2

a) 1	b) $z + x'$
c) $xz + y'$	d) $z + y'z'$

6) If the complement of the function F is expressed as  $F'(A, B, C, D) = \sum(2,4,5,6,8,9,11,12)$ , Then F could be expressed as: marks: 2

a) $\sum(0,1,3,7,10,11,13,14,15)$	b) $\prod(2,4,5,6,8,9,10,12)$
c) $\sum(0,1,3,7,10,13,14,15)$	d) $\prod(2,4,5,6,7,8,9,11,12)$

7) The circuit that takes an input  $X = X_2 X_1 X_0$  and calculate the output as follow:

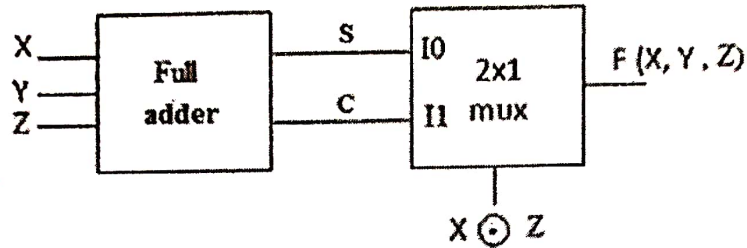
$$Y = \begin{cases} 0 & 1 \leq X < 3 \\ 1 & 4 \leq X < 7 \end{cases}$$

The circuit could be expressed as

marks: 2

a) $\Sigma(4,5,6)$	b) $\Sigma(4, 5, 6), d(0, 3)$
c) $\Pi(1, 2), d(0, 3, 7)$	d) $\Pi(0, 1, 2, 3, 7)$

Questions 8 and 9, For the following Function  $F(X, Y, Z)$ ,



8) When X, Y and Z equal 1, 0 and 1 respectively, then F equals ..... marks:2

a) 0	b) 1
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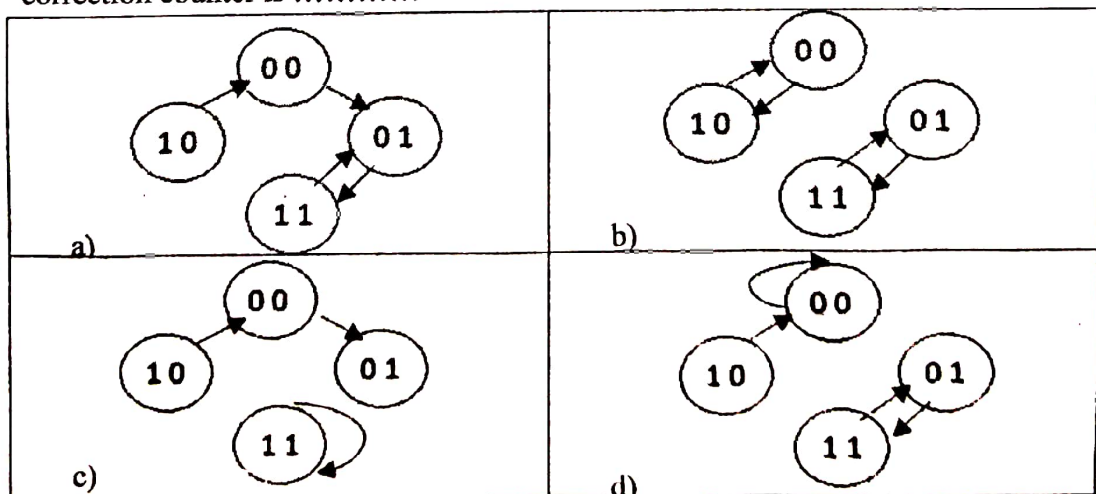
9) When X, Y and Z equal 1, 1 and 0 respectively, then F equals ..... marks:2

a) 0	b) 1
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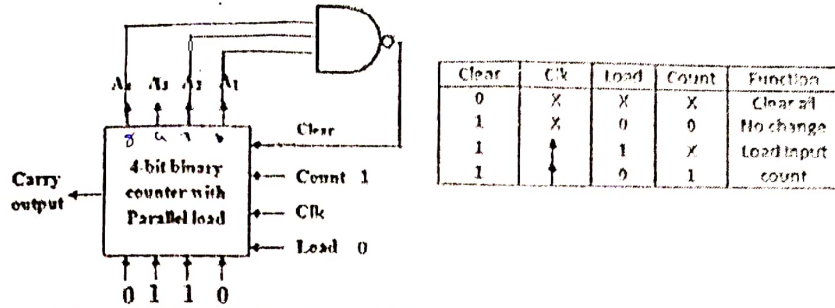
10) If the function  $F(A, B, C) = \Sigma(0, 4, 6, 7)$  is implemented using 4x1 mux with A and C on selections then the inputs from  $I_0$  to  $I_3$  will be equal to ..... respectively. marks:2

a) $B', 0, B', 1$	b) 0, 1, 0, 1
c) $B', 0, 1, B$	d) $B', B, B', B$

11) From these state diagrams, the one that can be a state diagram for a self-correction counter is ..... marks:2

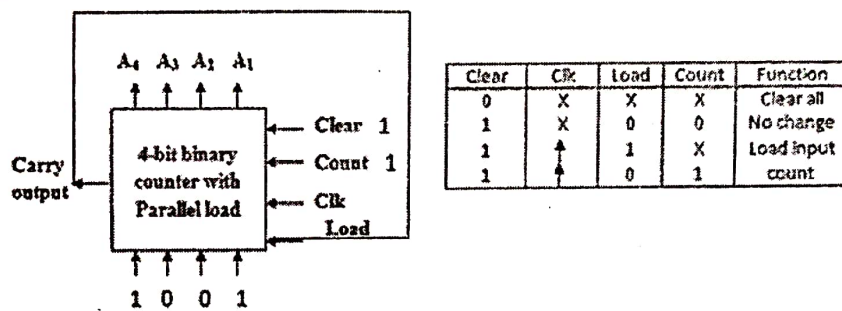


12) Using the following 4 bit programmable counter with the given function table, It will count..... marks: 2



- |            |            |
|------------|------------|
| a) 0 to 6  | b) 0 to 11 |
| c) 6 to 11 | d) 6 to 10 |

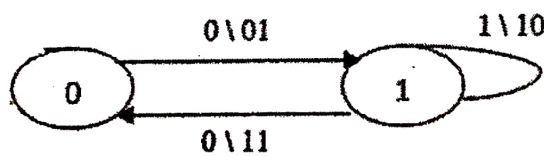
13) Using the following 4 bit programmable counter with the given function table, we can get ..... marks: 2



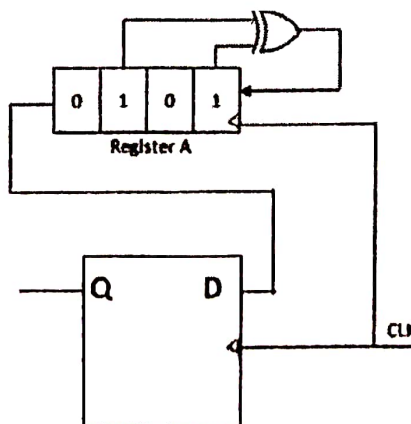
- |        |         |
|--------|---------|
| a) F/7 | b) F/9  |
| c) F/8 | d) F/10 |

2<sup>nd</sup> Question marks: 16

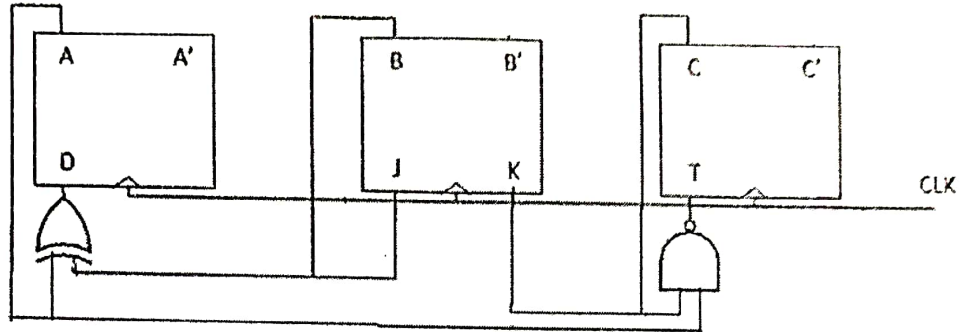
A) Design a sequential circuit using JK flipflops according to the following state diagram. marks: 10



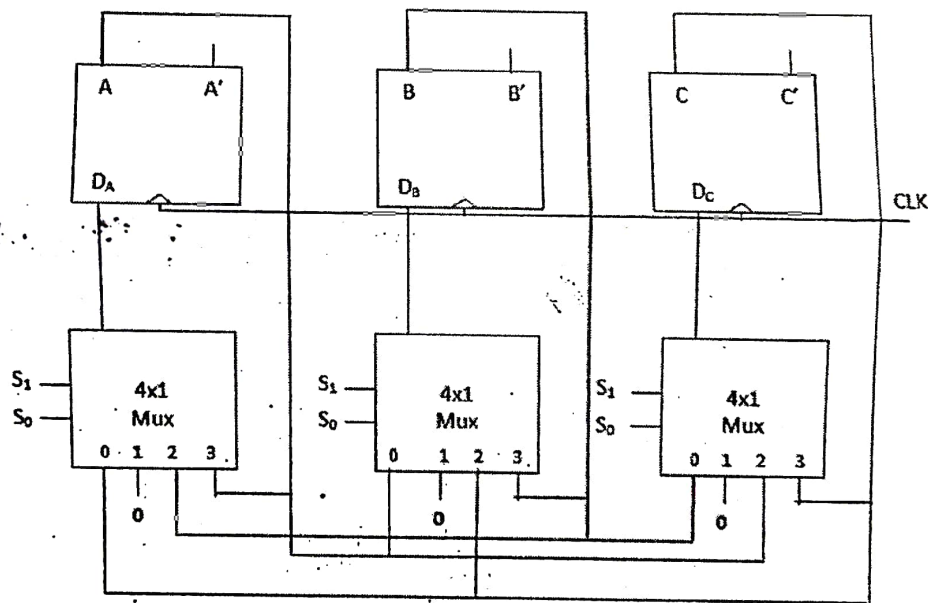
B) Find the content for the 4 bit shift registers and the value of Q during 4 clocks. The initial value for Q is Zero. marks: 6



A) Analyze the following circuit then find its state table and state diagram marks: 8



B) Follow the circuits connections, then find the function table of the given universal shift register of 4 different functions (All muxs have the same selection control). marks: 4



*With My Best Regards,  
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