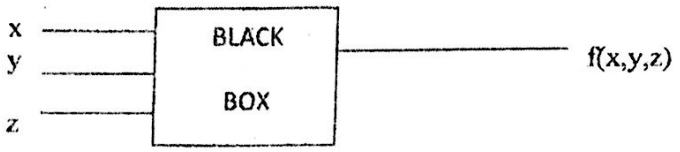
S.V.NATIONAL INSTITUTE OF TECHNOLOGY, SURAT
B. Tech. II (EC) 3rd sem

SUBJECT: Digital Logic Design (EC203)

Mid Test (Sept -2012)

Time: 1 hour **Total Marks: 30**

Q.1 a **02**



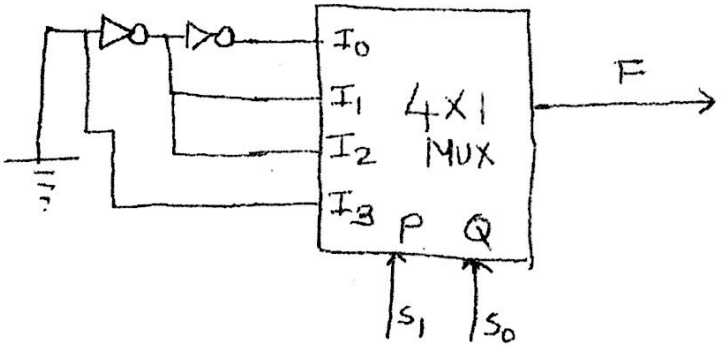
The black box in the above fig. consists of only AND, OR and NOT gates. The function f (x, y ,z) =1 wherever x, y are different and 0 otherwise. In addition the 3 inputs x, y, z are never all the same value. Find sum of minterm and Boolean function of f (x,y,z).

b Minimize the following Boolean expression in POS form with the help of K-Map : **02**

$$F(u, v, w, x) = \sum m(1, 5, 7, 9, 13) + \sum d(8, 10, 11, 14)$$

c Simplify the logic in SOP form for circuit that will cause a light to go on each time the decimal equivalent of a 4 bit binary input is divisible by 3. It is known that the numbers 0,1,7,11,14 will never occur as inputs. Find sum of minterms and product of maxterm also. **03**

d What is the function implement at output by following figure? **02**



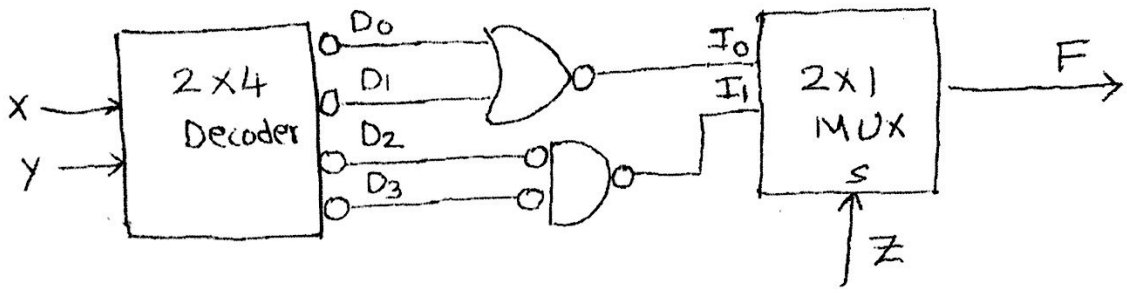
e Write truth table for three coins, where the output is 1 if and only if exactly one of the coins is Head after a toss of three coins at a time. (i)Find the minterm expansion of F. Implement F using active high output decoder. **03**

f Design the simplified circuit NOR-NOR realization for the Boolean function **03**

ABCD + AB'C'D' + A'B'CD + A'BC'D + ABCD' + A'BCD'+A'BCD

OR

f Find logic value **HIGH/LOW** for Io, I_1 and F for following figure if i) xyz=001 ii)xyz=110 **03**



Q:2 a A person on a SATURN processing 18 fingers has a property worth $(1, 00,000)_{18}$. He has 3 daughters & 2 sons. He wants to distribute half of the money equally to his sons & remaining half to his daughters. How much his each son & each daughter will get in Indian currency? **03**

b The state of 12-bit register is 1000 1001 0111. What is its equivalent value in decimal, if it represents in (i) 8421 BCD code (ii) binary gray code & (iii) 84-2-1 BCD code. **03**

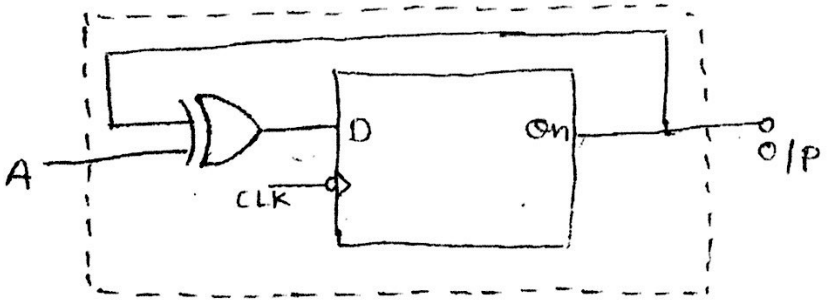
c The 2's complement representation of a 16 sign bit number is FFFF. Represent the magnitude of this number in decimal. **01**

d Express $(-45)_{10}$ in 8 bit sign 2's complement form. **01**

Q:3 a Make the characteristic table and characteristic equation for the following flip-flop, having input A. **03**

i) Whether the functionality of this flip flop equivalent to any four flip flop? If yes, find which one.

ii) If A=1 and 50 khz clock is applied to this flip flop what will be the frequency of output Q?



b Realize the sequential circuit for the state diagram shown in fig. Use D flip-flop **04**