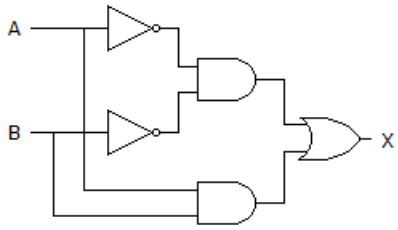
(3hours) Marks: 80

NB 1. Question No.1 is compulsory
2. Attempt any three out of remaining five questions

1a. Find one's and two's complement of (110011) 4
1b. Compare the truth table of JK and SR flipflop and hence explain which is suitable for making a D and T flipflop. 4
1c. Identify the logic gate represented below and write its truth table 4



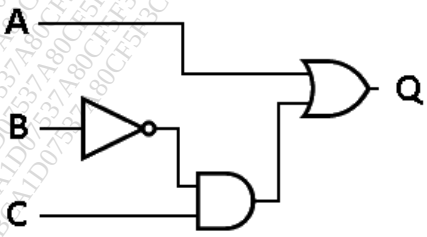
1d. Explain the flag register of 8051 microcontroller 4
1e. Explain the instructions DJNZ register, rel address, INC Register and DEC Register 4

2a. Implement $Y= \sum m (0,1,2,3,4,7, 13,14,)$ using 16:1 multiplexer and two 8:1 multiplexer 8
2b. Explain the architecture of 8051 microcontroller. 8
2c. Explain the use of clock input in a flip flop 4

3a. Design the circuit for half adder and half subtractor 8
3b. Explain the conversion of JK flip flop to D flip flop using K maps. 6
3c. Explain the functional pin diagram of 8051 microcontroller 6

4a. State and explain the De Morgan's theorem using truth table. 8
Draw the truth table of bubbled OR, bubbled AND, NAND and NOR gate and explain the significance with reference to De Morgan's theorem
4b. Explain working of any one machine used in the printing or packaging industry and hence explain how it can be improved using a microcontroller. 8
4c. Convert hexadecimal no 452 and octal no 452 into decimal number and binary number 4

5a. For the circuit given below, find the output and implement the same output using NAND gates 6



5b. Given $Y= \sum m (0,1,2,3,4,7,10,13,14,15)$, simplify using Kmaps and draw the circuit diagram using basic gates. 6

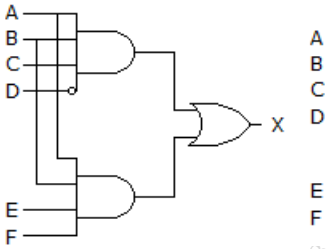
5c. Explain the given program showing register status at every stage. 8

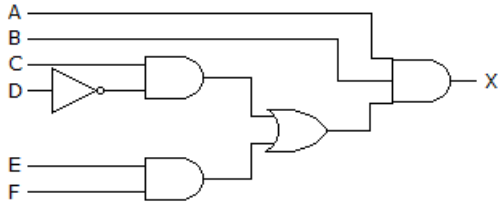
```
    MOV A,#04
    MOV B,#02
    DIV AB
    MOV DPTR, # 4500
    MOVX @DPTR,A
    INC DPTR
    MOV A,B
    MOVX @DPTR,A
4100:  SJMP 4100H
```

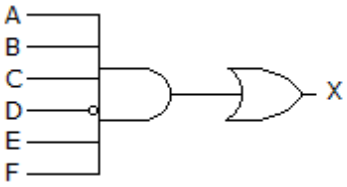
6a. Write a program in 8051 assembly language to add three numbers stored in location 4000H to 4002 H and store the result in 4003H. 6

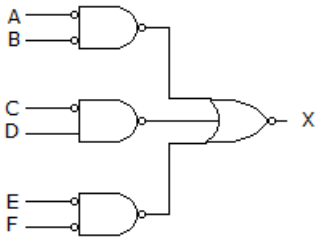
6b. Explain the different types of shift register. 4

6c. Predict the output 10









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