DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH SEMESTER-3 (CE)
SECOND SESSIONAL
SUBJECT: (CE-308) Design of Digital Circuits

Examination	: Second Sessional	Seat No.	: ३१
Date	: 06/09/2023	Day	: Wednesday
Time	: 11.00 AM to 12.15 PM	Max. Marks	: 36

INSTRUCTIONS:

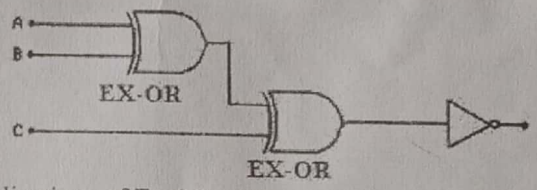
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed. **[12]**

CO3 (a) A and B are inputs in the given table. Which of the function(s) represent(s) sequential circuit(s)? [2]

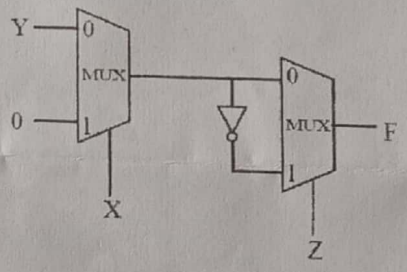
A	B	F1	F2	F3	F4
0	0	0	1	1	0
0	1	1	0	0	0
0	0	0	1	1	0
1	0	1	1	1	1
0	1	0	0	1	0
1	0	1	1	0	0

CO2 (b) Which function is generated by the given circuit? Provide the truth table of the same. [2]



CO2 (c) Mention four applications of Ex OR gate. [2]

CO2 (d) Consider two cascaded 2:1 Multiplexers. Determine the value of output F. [2]



CO2 (e) Show the design of a ROM which implements a Quadruple 2 to 1 line multiplexer with common select and enable inputs. Also mention ROM dimensions. [2]

CO2 (f) How many NOT gates are required for the construction of a 8-to-1 multiplexer ? [1]

CO2 (g) In a 4 to 2 Priority Encoder, If the Input Y3 Y2 Y1 Y0 is 0011, then what would be the output ? [1]

Q.2 Attempt *Any TWO* from the following questions. [12]

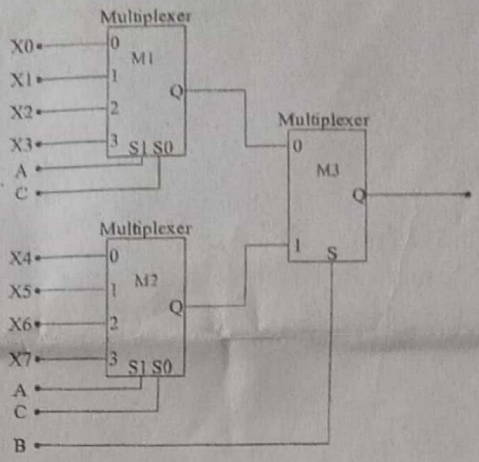
(a) Design a combinational circuit that has four inputs, P,Q,R and S, and whose output A will be HIGH when a majority of the inputs are HIGH and output Bwill be HIGH when an odd number of inputs are HIGH.

(b) How many SR flip-flops are required to design a register which can store one byte of data? What is an indeterminate state in a flip-flop? Is there any indeterminate state in SR flip-flop with NOR implementation? Justify your answer.

(c) Design a combinational circuit to convert 4 bit binary code to 5 bit BCD code.

Q.3 **Attempt the following** **[12]**

CO2 (a) [6]



Derive the sets of values of (X2, X3, X4, X6) where X0 = X1= X5 = 1 and X7 = 0 that will realize the Boolean function **A' + A' · C' + A · B' · C**. Also, show the steps of Derivation with Boolean expressions.

CO2 (b) Design the circuit for 3-bit Binary to Gray Code Converter using 3-to-8 Decoder and 8-to-3 Encoder. Also, derive the Boolean expression for the same designed circuit. [6]

OR

Q.3 **Attempt the following** **[12]**

CO2 (a) Demonstrate the use of PLA circuit, Construct the program table and logic circuit for BCD toExcess 3 Code converter. [6]

CO2 (b) Design the circuit for 4-bit Binary to Radix 12 Converter using 4-bit Binary Adder. Show the steps of conversion using Truth Table and Boolean Expression. [6]