



Indian Institute of Information Technology Vadodra

End Sem Examination-Autumn-2021-22
Specialization: B. Tech. (CSE & IT)
Course Code: EC-201 (Digital Logic Design)

Time: 1 Hours

Date: 07/01/2022

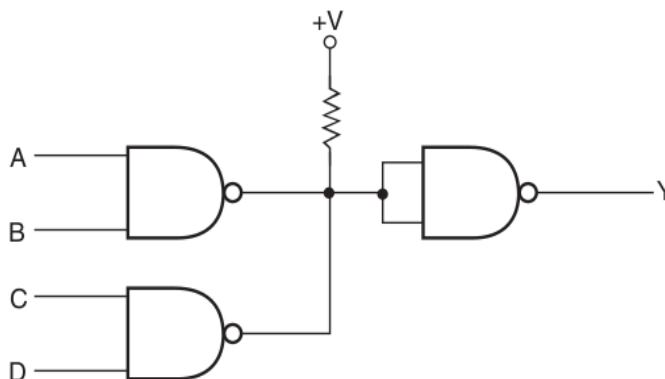
Max. Marks: 50

Read the instructions carefully.

- Attempt ALL the questions. Each question carry 10 Marks.
- OnlineStudents: Take a fresh Notebook to write the answers for all sessions in sequential manner. On top of each page, write Institute ID, Name and Signature. Evaluation will not be done for pages without the detail.
- Offline Students: Do the same as per the answer provided.
- Write each new answer in the new page.
- Scan the pages and save in pdf format with file name: EndSem_EC201_Student Roll no._Name_Section 1/2 _Campus

1.

a) For the given logic circuit, Find out the value of Y.



b) Simplify the following equation

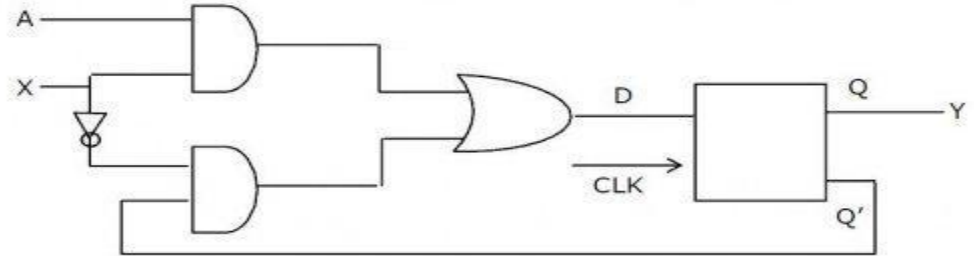
$$PQRS + PQR'S' + PQRS' + PQR'S + PQRST + PQR'S'T' + PQR'ST$$

2.

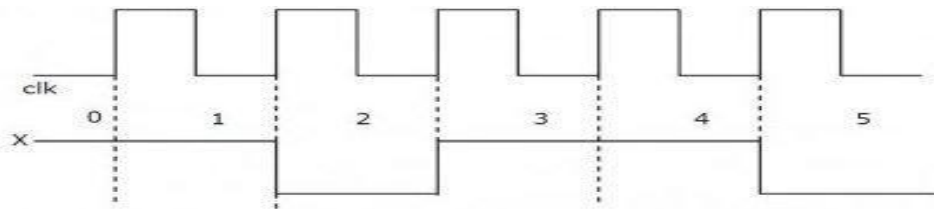
a) For given function $Z(P, Q) = \sum 0, 2$. Find the product of the sum of $Z(P, Q)$ and also find the POS and SOP of $Z'(P, Q)$.

b) How many flip-flops are required to make a MOD-32 binary counter?

3. a) For a given positive edge triggered D FF.

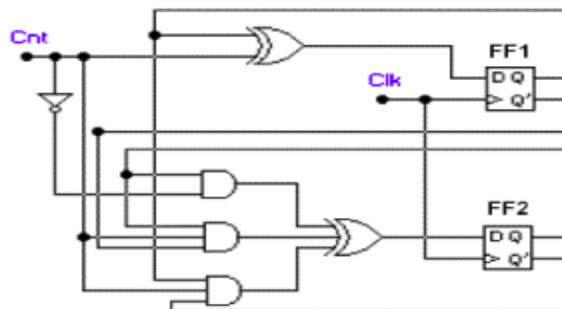


Consider the following timing diagram. Let A_i represent the logic level on the line A in the i -th clock period. Let A' represent the complement of A. The correct output sequence on Y over the clock periods 1 through 5 is



- b) Write VHDL code to realize the XOR, XNOR and to check the functionality by simulating the design.

4. a) Following circuit given , Find out state table and diagram



- b) Following table given, Design a circuit using any flip-flops

Present State Q ₀ Q ₁	Next State		Output	
	X = 0 Q ₀ Q ₁	X = 1 Q ₀ Q ₁	x = 0	x = 1
0 0	0 0	0 1	0	0
0 1	0 0	1 0	0	0
1 0	1 1	1 0	0	0
1 1	0 0	0 1	0	1

5. a) Design n-bit binary adder-subtractor. Where n is the last digit of your phone number.

b) The next state table of a 2 bit saturating up-counter is given below.

Q_1	Q_0	Q_1^+	Q_0^+
0	0	0	1
0	1	1	0
1	0	1	1
1	1	1	1

The counter is built as a synchronous sequential circuit using T flip-flops. Find out the value for T1 and T0.