

OPEN BOOK

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
4. Use of Programmable Calculator is not allowed.

Q.1A Implement the following expression using 2 input NOR gate only

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$$F = y'z' - wx' - w'z'$$

Q.1B Simplify using Boolean Algebra.

$$\overline{A\overline{B}} + ABC + A(B + A\overline{B})$$

Q.2 Design a combinational circuit which accepts a two-bit number and generates an output that is square of the number. Draw the truth table, K map and logic circuit diagram

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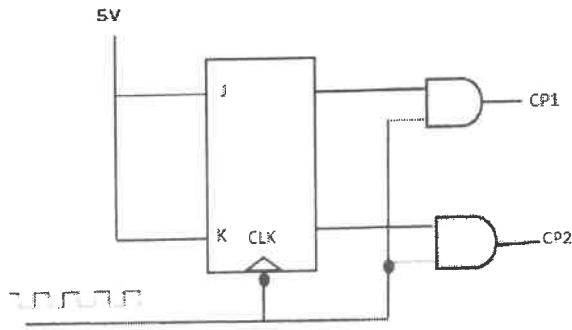
Q.3 A 8X1 multiplexer has inputs A,B, and C connected to the selection lines S2, S1,S0 respectively. The data at inputs is as follows:

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I1=I2=0; I3=I7=1; I4=I5=D and I0, I6=D'. Draw the truth table assumed by you for this design and write the function implemented in SOP form.

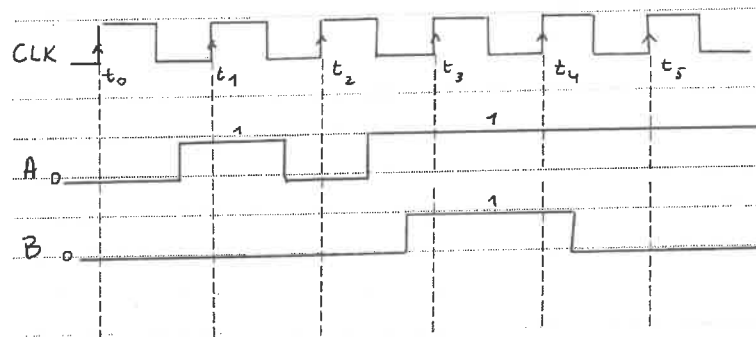
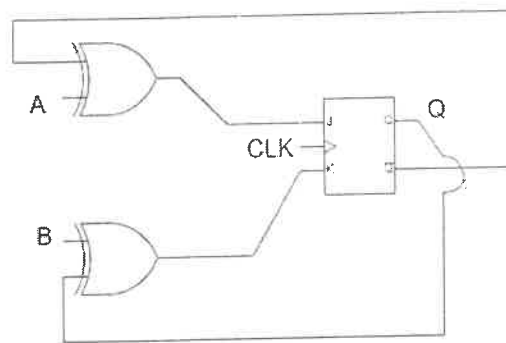
Q.4 Draw the timing diagram for output CP1 and CP2 for the following flip flop circuit for atleast 4 clock pulses

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Q.5 Consider the following sequential circuit. Draw the timing diagram for output Q , assuming initial state $Q(0) = 0$

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Q.6 A High circuit consisting of a resistor of $1\text{K}\Omega$ in series with a capacitor of 10 nF is connected across a 1V sinusoidal supply. Calculate the cutoff frequency. What will be the output voltage at a frequency 0.1 times the cutoff frequency? Sketch the asymptotic approximation of transfer function magnitude.?

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