Question Paper Code: U3B06

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Third Semester

Biomedical Engineering

21UBM306 - DIGITAL LOGIC CIRCUITS

(Regulations 2021)

Duration: Three hours   Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1.	Implement Boolean expression for EX - OR gate using NOR gates only.	CO1-App
2.	Simplify (A'+B) (A+B)	CO1-App
3.	Why carry look ahead adder is faster than ripple carry adder and full adder?	CO1-App
4.	Implement a logic diagram for the device which changes from serial data to parallel data.	CO1-App
5.	Analyze the differences between Latch and Flip-Flop.	CO2-U
6	Mention the steps for the design of asynchronous sequential circuit	CO2-U
7	Define dynamic hazard. When do they occur?	CO3-U
8	How to differentiate fundamental mode from pulsed mode asynchronous sequential circuit.	CO3-U
9	Why RAMs are called as Volatile?	CO4-U
10	Differentiate static and dynamic RAM.	CO4-U

PART – B (5 x 16= 80 Marks)

11. (a) Find the minimal sum of products for the Boolean expression   CO1-App   (16)
F= (A, B, C, D) = $\sum$ (0,2,3,6,7,8,10,11,12,15) using Tabulation Method.

Or

(b) Plot the following logical Expression on a 4-variable K – map CO1-App (16)
F=ABCD+AB'C'D'+AB'C+AB & realize the SOP using only
NAND gates and POS using only NOR gates

12. (a) Implement the following Boolean function using an 8:1 CO2-App (16)
multiplexer considering D as the input and A,B,C as selection lines
F(A, B, C, D) = AB'+BD+B'CD'

Or

(b) Write a brief note on the following combinational circuits: CO2-App (16)
(i) Full adder (ii) Full subtractor

13. (a) Summarize 4-bit SISO SIPO, PIPO and PISO shift register and CO3-App (16)
draw its waveforms.

Or

(b) Design for a 4 bit ring counter using J-K flip flops and D flip flop CO3-App (16)
and justify your answer

14. (a) Design an asynchronous sequential circuit with two input X and Y CO3-App (16)
and one output Z. The output Z=1 if X1 changes from 0 to 1.Z=0
if X2 changes from 0 to 1, and Z=0 otherwise.

Or

(b) Design a circuit that has no static hazards and implement the CO3-App (16)
Boolean function $F(A,B,C,D) = \Sigma$ (0,2,6,7,8,10,12) using AND-
OR logic.

15. (a) Analyze the combinational circuit given below, using PLA CO4-Ana (16)
$F1(A,B,C) = \Sigma$ (0,1,2,4) ; $F2(A,B,C) = \Sigma$ (0,5,6,7)

Or

(b) Implementation the following Boolean function using PAL CO4-Ana (16)
$W(A,B,C,D)=\sum m(0,2,6,7,8,9,12,13)$
$X(A,B,C,D)=\sum m(0,2,6,7,8,9,12,13,14)$
$Y(A,B,C,D)=\sum m(2,3,8,9,10,12,13)$
$Z(A,B,C,D)=\sum m(1,3,4,6,9,12,14)$

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