Reg. No. :

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

Third Semester

Biomedical Engineering

21UBM306 - DIGITAL LOGIC CIRCUITS

(Regulations 2021)

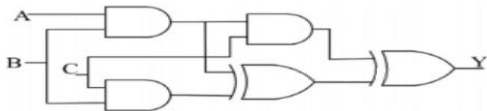Duration: Three hours   Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1.	Express the function Y =A+B'C in canonical POS	CO1-App
2.	Simplify (A'+B) (A+B)	CO1-App
3.	The output of the combinational circuit given below is	CO1-App

4.	For the device shown here, let all D inputs be LOW, both S inputs be HIGH, what is the status of the Y output? Explain your answer with an example	CO1-App
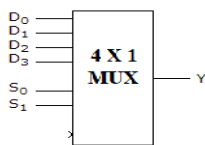
5.	Tabulate the differences between edge triggering and level triggering in sequential circuits.	CO2-U
6	Mention the steps for the design of asynchronous sequential circuit	CO2-U
7	Define dynamic hazard. When do they occur?	CO3-U
8	How to differentiate fundamental mode from pulsed mode asynchronous sequential circuit.	CO3-U
9	Why RAMs are called as Volatile?	CO4-U
10	Differentiate static and dynamic RAM.	CO4-U

11. (a) Obtain (a) minimal sum of product and (b) minimal product of sum   CO1-App   (16)
expression for the given below y= $M(1,2,3,7,8,9,10,11,14,15)$
using Karnaugh map method and draw the logic diagram

<div align="center">Or</div>

(b) Find a minimal sum–of–products for the Boolean expression   CO1-App   (16)
$f(w,x,y,z) = \sum m(1,2,3,7,8,9,10,11,14,15)$ using the Quine-Mc
Cluskey method.

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'

<div align="center">Or</div>

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

13. (a) Outline the working principle of JK FF and explain the   CO3-App   (16)
Master/Slave JK FF.

<div align="center">Or</div>

(b) Using SR flip flops, design a parallel counter which counts in the   CO3-App   (16)
sequence 000,111,101,110,001,010,000,…

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.

<div align="center">Or</div>

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

15. (a) Implementation the following Boolean function using PAL   CO4-Ana   (16)
W(A,B,C,D)=$\sum$m(2, 12,13)
X(A,B,C,D)=$\sum$m(7,8,9,10,11,12,13,14,15)
Y(A,B,C,D)=$\sum$m(0,2,3,4,5,6,7,8,10,11,15)
Z(A,B,C,D)=$\sum$m(1,2,8,12,13)

<div align="center">Or</div>

(b) A Combinational Circuit is defined by the function: CO4-Ana   (16)
F1=$\sum$m(3,5,7) F2 =$\sum$m (4, 5, 7) Implement the circuit with a PLA
having 3 inputs, 3 product terms and two outputs

<div align="center">2</div>