Registration No.: | | | | | | | | | | |

Total Number of Pages : 02 **Course: Integrated Dual Degree (B.Tech and M.Tech)**
Sub_Code: REL4C001/ REE4C001/RBM4C001

4th Semester Regular/Back Examination: 2023-24
SUBJECT: DIGITAL ELECTRONICS
BRANCH(S): ELECTRICAL, EE, EEE, BIOMED
Time : 3 Hour
Max Marks : 100
Q.Code: P056

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions :** **(2 x 10)**

a) Find out the hexadecimal equivalent of $(707.77)_{8.}$
b) Write down any two applications of EX-OR gate.
c) What will be a $\oplus$ b, If ab = 0?
d) How many 3 to 8 line decoders with an enable input are needed to construct a 6 to 64 line decoder without using any other logic gates?
e) Write the difference between synchronous inputs and asynchronous inputs.
f) The output of a J-K flip-flop is 0. Its output does not change when a clock pulse is applied. What can be the inputs J and K respectively?
g) What is ALU?
h) Differentiate between PLA & PAL.
i) What is sequential circuit? Also draw a 1-bit memory circuit.
j) What is FPGA?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) Implement EX-OR gate using minimum number of NAND gates.
b) Obtain the simplified form for the given maxterm expression using K-map. $f(A,B,C,D)=\prod(0,1,4,5,6,7,9,14)\cdot d(13,15)$
c) Implement the given functions using single 3:8 decoder.
$f_1(A,B,C)=\prod(2,3,4,5,7)$
$f_2(A,B,C)=\sum(1,3,5)$
d) Illustrate CCD memory and write its few applications.
e) Explain any one of the error detecting & error correcting coding scheme.
f) Explain Mod-5 ripple counter using JK-FF with its output wave forms.
g) Explain operation of 4-bit SIPO with necessary diagram.
h) Write down the specifications for D/A converter and also explain it.

i) Design a magnitude comparator to compare two 3-bit binary numbers.

j) Give an example of A/D converter and mention its few important characteristics.

k) Design S-R flip-flop to D flip-flop conversion. Find the conversion table.

l) Explain the operation of TTL with required diagram.

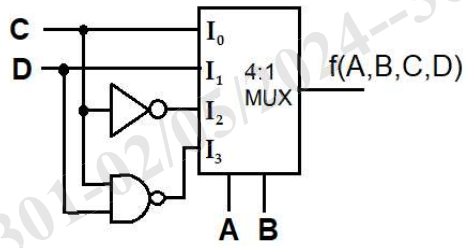
Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 **a)** Simplify the given function using K-map. Also find its POS result. **(8+8)**

$f\ (A,B,C) = \sum m(0,2,4,6,7,8,10,12,13,15)$

b) Find the Boolean function implemented in the figure using 4:1 MUX.



Q4 **a)** Design a BCD adder with proper explanation. **(8+8)**

b) Discuss the working of CMOS circuit as a digital logic operation.

Q5 Design a decade counter using T-FF. Also draw its waveforms. **(16)**

Q6 **a)** Explain the design principle of ROM. Mention its differences than RAM. **(8+8)**

b) Explain A/D converter using voltage-to-frequency conversion with proper circuit and waveforms.