Total number of printed pages:2 **D/3rd/DECE303**

2022

SUBJECT NAME : Digital Electronics

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

Q.1 a) Use Boolean algebraic techniques to simplify 2X5=10

i) a+abc ii) a'+ab iii) a+b+ab+1 iv) xy+(xy)' v)(x+y)(x+y')

b)Prove that (a+b)'=a'.b' 4

c) Use basic gates to realize 3X2=6

i)Y= ab(c+d') ii) ab'+cd

Q.2 a) Use k-map method to simplify the following 5+6=11

i)f(x,y,z)=∑m(0,2,3,5)

ii)f(w,x,y,z)= ∑m(0,1,3,7,9,10,15)

b) Use only NAND gate to realize 3+2+4=9

i)Y=a+b ii)Y=ab iii)Y=ab+c

Q.3 a) Design following combinational circuits 5+4+5+6=20

i) 2to 4 Decoder

ii) Half subtractor

iii) 1:4 De-Multiplexer

iv) Full Adder

Q.4 a)Write down the truth table/Function table of the following circuits 3X4=12

i) S-R latch ii) J-K latch iii)4 to 2 Encoder iv) 4:1 Multiplexer

b) Define max term and minterm 2+2=4

c) Convert f(x,y,z)=xy+yz into canonical SOP form 4

Q.5 a) Draw logic diagram of the following circuits 3X3=9

i) S-R latch ii)D-latch iii)S_R latch with enable

b) Use Boolean algebraic techniques to simplify 3+3+2+3=11

i) (x'+y)'+(x'y)'+xyz ii) (x+y+z)(x+y'+z) iii) x.x.x+x+x'+1 iv)abc+(abc)'

Q.6 Describe general method of designing any combinational circuit. 20