*Total number of printed pages:2* **UG/3rd/UECE306**

**2024**

**SUBJECT NAME : Digital Electronics & Logic Design**

*Full Marks : 100*

Time : Three hours

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

*Answer **any five** questions.*

Q.1 a) Prove that x+yz=(x+y)(x+z) 5

b)Use basic gate(without simplifying the function) to realize Y=abc'+a'b'c'+ab'c 5

c) Use only NOR gate to realize Y=(a+b')(a'+c) 4

d)Use Boolean algebraic techniques to simplify f(x,y,z)= xyz+xyz+(x'+y'+z')+xy'z' 3

e) Convert

i) hexadecimal FA1 into binary ii)0011111 into octal iii) decimal 45 into octal 3

Q.2 Use k-map method to simplify the following 4+5+6+5=20

a)f(x,y,z)=$\sum$m(0,1,2,3)

b)f(w,x,y,z)= $\sum$m(0,1,2,3,7,9,10)

c) f(w,x,y,z)= $\sum$m(0,2,7,9,10,11,12) +d(1,3,15)

d) f(w,x,y,z)= $\pi$M(0,1,3,9,10)

Q.3 Design following combinational circuits 5+7+5+3=20

a) 4 :1 multiplexer.

b) Full subtractor

c) 4:2 Encoder

d)Half adder

Q.4 Describe following circuits operation with circuit diagram , truth table etc. 5X4=20

a)S-R latch b)J-K latch c)Master slave flip flop d) Pulse triggered flip flop.

Q.5 Describe 2 bit asynchronous counter operation with block diagram , timing diagram, counting status table etc. 20

Q.6 a) State and prove de-morgan's theorem 2+6=8

b)Design a 1:8 De-Multiplexer . 6

c) Differentiate the following 3X2=6

i)Combinational & sequential circuit ii) Edge &pulse triggering

Q.7 a) Describe 4 bit right shift register operation with block diagram , timing diagram etc. 14

b) Use Boolean algebraic techniques to simplify 3+3=6

i) (a+b+c)(a+b+c')(a+b')+abc ii) x.x+x.x'+(1+x')'+(xy)'