1) Realize the following functions

using

NAND gates only.

•)

FEAT+CD

⇒

AB+CD (T=x)

⇒

ABT. CD

का

=>

A-Ba

C-D

لم

ठ

B

c

D

-Da

च

اله

b) xyz +

$x'y'z'$

$\neg$

$\Rightarrow$ xyz + x'y'z

xyz (xyz),

xyz

how

F

WAND

many

gates ?

и уз

(уз)

F

क

(*2yz)*

Do

2) using OR and NOT gates only

F= xy + xy + ÿr

уз

OR

NOT-

= xy + x

+ y2

y

jz

→ Appy

ny

=) (x+4);

(x+y); (y+3)

xy3

Appy
Demorgan's

$$(x + y) + (x + y) +$$
$$(y + \})$$

to
est

to

3) Determine the Boolean function and the wuth dakle for the *opp* @ F of the logic

circuit.

a

Ъ

c

(ä+*5*+(

)

a

(a+5)

F= ?

ꞁ

5

✓ =

(a+b+c)+(a+b)+5

c

ать

= (a+b+c) + (a

+5)+5 +(a+b)+b

=>(ä +5+ () +(a+5) +b

x+y=x+y

قاك

7

abć tabt b

→ abc + ab +

5 (ata)

abc tabt

abtāb

7=(145) to

(6+6=)

тасът

=> a+ a

((646) (6+ c)

- a + a(5+č)

a

=> à tab tač

a

=> (ata) (a+b)

tač

Сать =

a+b+ać

1

= ăṭactь

(apa) (a+c)

+5

=

f(a, b, c) =

a+5+ā

3 variables -

23 = 8

decimal

range=0-7

4

2

a b c

a b c F= a+b+c

ら

a

o

o

o o

い

1

ง

11 0

2

0

10

101

3

0

1

○○

ررلا

100

○

○

10

61

001

○○○

○

b)

y

Di

F = x+y

}

ätz

(žy)+(x+8)

=> (2y)+(x+3) -

x+y+x-8

ʅ

=> x

x y z

ooo

0 0

[

し

>> x+y

1

=x+y

I

2

10

3

4~1

ﻓا

J

لم

0

IN

1

61 1

✓

午

1

ﻭ

o

1

?

3) using (AND) gates only

F(A,B,C) = (a+b+c) (a'+ B'+c)

い

い

(A+B+c)(x+

(A+B+C). (A+

B+ C)

(NBC) +
(ABE)

A.B.č. A.BC

z-y=x+y
य

xo

x+y=x-y

(JBC J.
(1.B.C)
BC

NAND NAND
NAND

↓

NOT

118

=x

A B C

A

Ā B$\bar{E}$

F

ABE

Using theorems and laws

J

Boolean

Algebra simplify the following 1)

(a+b+c+d).(a+b+c+ā).(a+b+c+d) (a+b+c+d);

(a+b+c+d),

(a+b+c+d)

(a

+6+C

汁

今

(a + 5+

ét,

(ätötét

а это

=7 н+уз

(a+b+c) (a + b +

c)) (a+b+c)

(y + x) (}

= (a+b+c)

(b+c+ α

brüt dã

= (a+b+c)

(ō+č)

at

=) ab+ ac + 16 +65 +56

+ ø 1272x

ē

b b

=> ab + a + bēt bētē ⟶

ab + c (a+67671)

=>

ab+ć

1:

X= **X=**0

2+1=1

|2+1

=

+) (ab+c+d) ((+1)

(c+d+e) / 2:2=0 →

(ab+c+d) (c+d+ ee)

(F+d+e)

Cét

f

e

→ (ab+c+d)

(c+d+ex.e) →

(ab+c+d) (c+d)

=)

ৰ

abc + abd +ectcd+ cd

+ da => abc + abd + d

cete） +d => abć + abd +dfd

t

اء

ᴛe

te

=) abe + d

(ab++++) JY RHIFI

今か

Ź abč td

x

⇒所(豆)+2(豆)+(夜)

xy

x

→ aÿ +xy +43

7

ニ

ク

(n+x)

туз

y

ž

= |

=> 5+43 (=x+43 =

(x+y) (x+3))

yз

$ (+4)

(9+8)

=5+3

مرا

Truth Table

1) Let as a represent front door and

back door

of

a y, yзy yз

house, Y, Y2 yz

be

3 lamps. Let y, turn on when both

turn on when

only front

doors open, y2 turn

on

yz

door is open and Ys

turn on when

only back door is open.

Represent this

in *T.T.*

ने

ilpx ->

a1

,

a2 322==4 (0-3

a

olps → Y1, Y2 Y3

az 14h Y2 Y

3

ar

0 ง

a

o

0

ว

อ

o

1

1

o

o

1

0

2

3

д

а

Q2 **2**

F

о

д

о

Уз

(О

R]

I

y

2) Write `T.T` for a 4 bit ilp systear indicating when majority of its `inputs` are true.

ay 2=`0-15`

sole :– 4 *ilps* →

4 ilps → a b c daž

12/P> logic

1(ON)

(

обл

л

|

いい

се *oe*

а

ь *c*

cd