$f(x, y, z) = \Sigma m(0\ 2\ 5\ 7)$.

KMap simplification,

$x \backslash yz$	00	01	11	10
0	1 (0)	(1)	(3)	1 (2)
1	(4)	1 (5)	1 (7)	(6)

Cells $(0,2) = \bar{x}\bar{z}$

Cells $(5,7) = xz$

To obtain product of sum

$x \backslash yz$	00	01	11	10
0	(0)	1 (1)	1 (3)	(2)
1	1 (4)	(5)	(7)	1 (6)

Cells $(1,3) = \bar{x}z$

Cells $(4,6) = x\bar{z}$

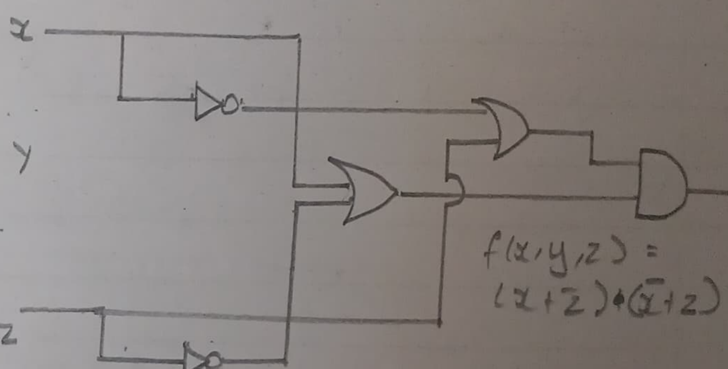
$\bar{f} = \bar{x}z + x\bar{z}$

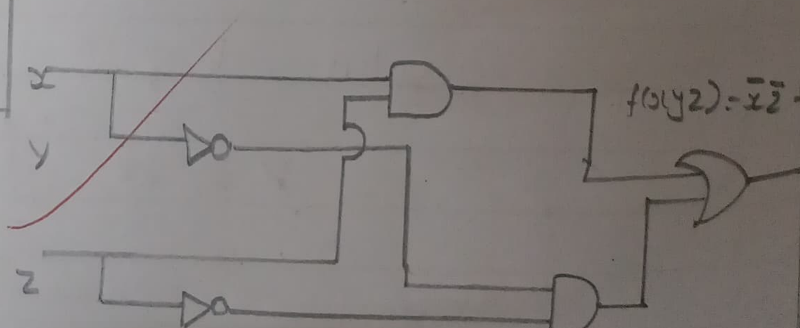
$f = \bar{\bar{f}} = \overline{(\bar{x}z + x\bar{z})}$

$= (x+\bar{z})(\bar{x}+z)$

Sum of Products $= \bar{x}\bar{z} + xz$

x	y	z	f
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1





K-Map

* Aim :

To implement a KMAP and to obtain the sum of products and product of sums for a given expression.

```
clc;
clear;
disp("The given expression is :")
disp(" f(x,y,z) = (0,2,5,7)")
x = input ("Value of x:")
y = input ("value of y:")
z = input ("value of z:")
sop = ((~x) && (~z))+(x && z)
pos = (x+(~z)) && ((~x)+z)
disp( "Result is : ")
disp (sop)
disp(pos)
```

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Output :

Enter frequency = 50
Enter line voltage =400
Enter Resistance =20
Enter inductance =0.1

'Ampere'
3.3301614-5.23100053i

'The line current'
3.3301614 - 5.23100053i

'is equal to phase current'
3.3301614 - 5.23100053i

'watt'

2307.2035+7.902D-14i
'The Power in a Star connection'

b/14?

Date ....

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* **Aim :**

To verify star and delta voltage - current relationships with only scripting and to calculate power.

- **Star connection :**

$V_L = \sqrt{3} V_{ph}$

$I_L = I_{ph}$

$P = \sqrt{3} V_L I_L \cos\phi$

$Z = R + jx$ (inductive load).

$Z = R - jx$ (capacitive load)

$x = 2\pi f L$ (inductive reactance)

$x = \frac{1}{2\pi f C}$ (capacitive reactance).

$f = \frac{1}{2\pi\sqrt{LC}}$

- **Script code :**

```
f = input ("Enter frequency");
VL = input ("Enter voltage line")
R = input ("Enter Resistance")
L = input ("Enter inductance");
x = 2* %pi *f*L;
Zph = R + (%i *x);
[r,t] = polar (Zph)
Vph = VL /sqrt (3);
Iph = Vph / Zph;
IL = Iph
```

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```
P = sqrt (3) * Vl * Il * cos(t);
disp ("Ampere ", Il)
disp (" The line Current ", Il, "is equal to phase
      current ", Iph);
disp ("watt ", polar (P), " The Power in a star Connection ");
```

* Mathematical Verification :

$x = 2\pi f \times 0.1 = 31.41$

$z = 20 + 31.4i$

$4 = 37.22$

$t = 57.50°$

$V_{ph} = \frac{400}{\sqrt{3}} = 230.94$

$I_{ph} = \frac{230.94}{37.22 \angle 57.5°}$

$= 6.204 \angle -57.5°$

$= 3.33 - 5.23i$

$I_L = 3.33 - 5.23i$

$P = \sqrt{3} \times 400 \times \cos(57.5) \times (3.33 - 5.23i)$

$= 1239.59 - 1946.87i$

$= 2307.2035 + 7.902 D - 14i$

Teacher's Signature :

Output :

Enter frequency : 50
Enter line voltage : 400
Enter resistance : 20
Enter inductance : 0.1

'Ampere'
9.9904843 - 15.693016i

'The line current'
9.9904843 - 15.693016i
'is equal to root 3 times phase current'
5.7680088 - 9.060367i

'watt'
6921.6105 + 1.973D-13i
'The power in a Delta connection'

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- Delta Connection :

$V_L = V_{ph}$

$I_L = \sqrt{3} I_{ph}$

- Code :

```
f= input ("Enter frequency ")
VL = input ("Enter line voltage.")
R = input ("Enter Resistance ")
L = Input ("Enter inductance ")
x = 2 * %pi * f * L;
Zph = R+ (%i *x)
[x, y] = polar (Zph);
Vph = VL;
Iph = Vph /Zph
IL = sqrt(3)* VL * IL x cos(t);
disp ("Ampere", IL)
disp ("The line current ", It is equal to root 3 times phase
      current ", Iph );
 disp ("Watt", polar (P), " The power in a Delta Connection");
```

* Mathematical verification :

$x = 2\pi \times 50 \times 0.1 = 31.41$

$Z_{ph} = 20 + 31.41i$

$(x, t) = 37.23, 57.51$

$V_{ph} = 400$

$I_{ph} = 400 / 37.23 \angle 57.51 = 10.744 \angle -57.51^\circ$

$I_L = 18.609 \angle -57.51^\circ$

$P = 6925.34 \angle -57.51$

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Teacher's Signature : ____________