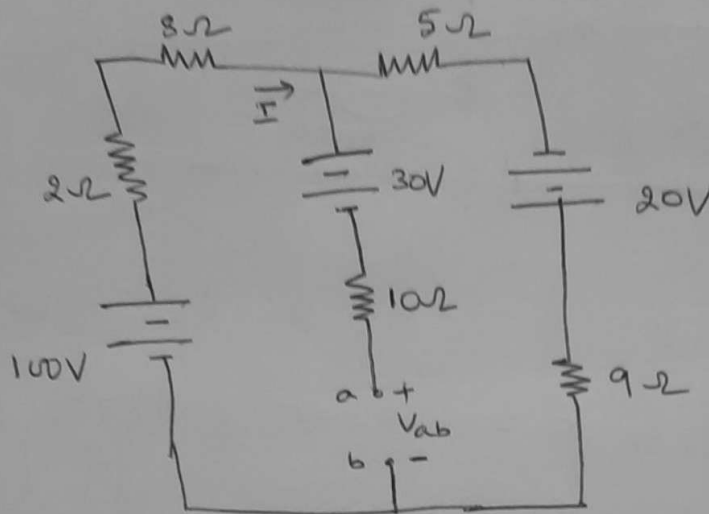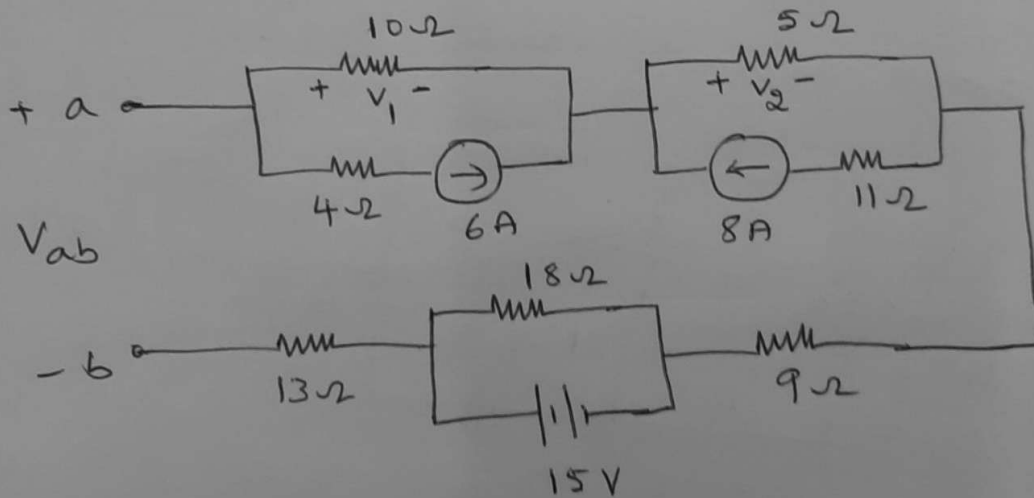# Tutorials

*1

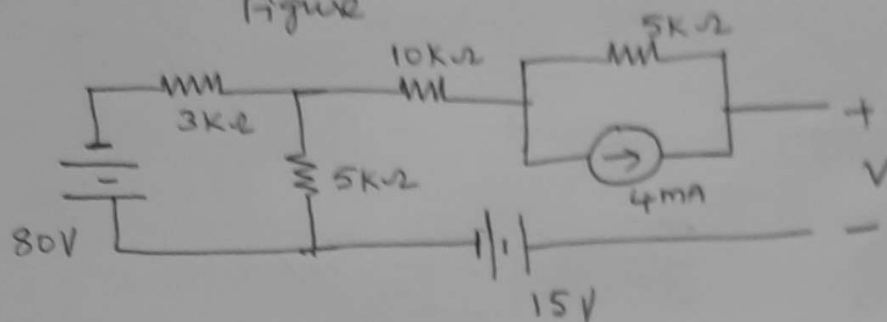Ex Calculate I and V_{ab} in the circuit of fig

Ans: $I = 5A$, $V_{ab} = 20V$

Ex: Determine the voltage drop V_{ab} across the open circuit in the circuit shown in fig.
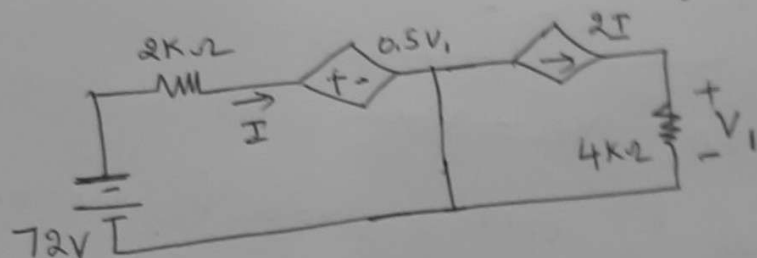

Solution: $V_1 = -60V$, $V_2 = 40V$

$V_{ab} = -35V$

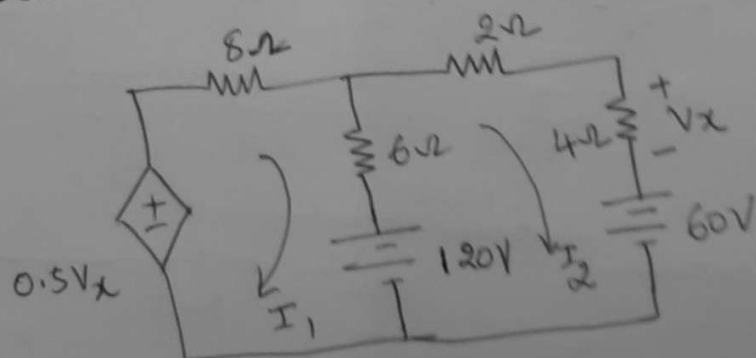Ex: Find V across the open circuit in the circuit of Figure

Ans: $V = -45V$

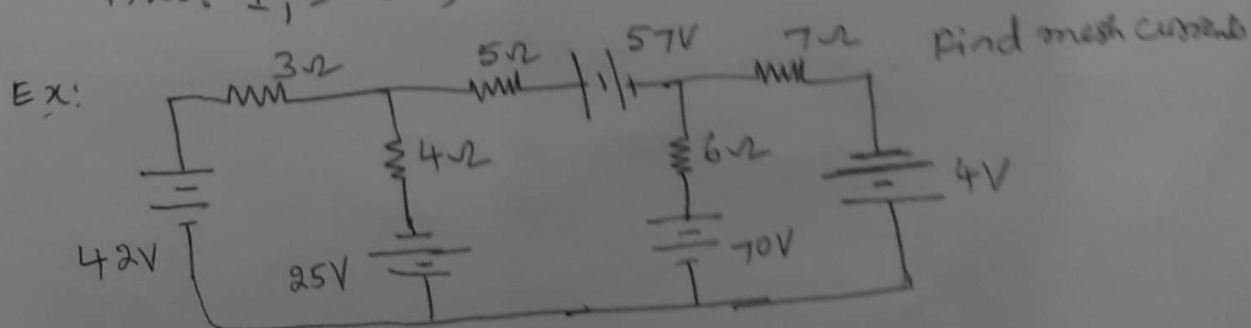Ex: Calculate V_1 in the circuit of Figure
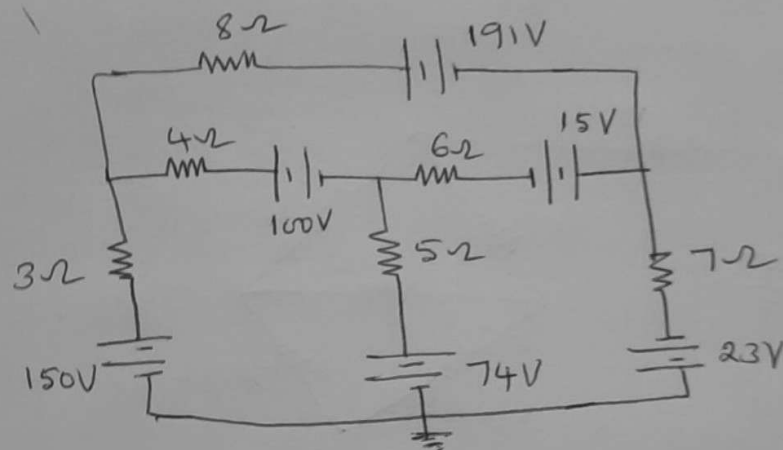

Ans: $V_1 = 96V$

Ex: Obtain the mesh currents

Ans: $I_1 = -8A$, $I_2 = 1A$

Ex: Find mesh currents

Ans: $I_1 = 5A$, $I_2 = -8A$, $I_3 = 2A$

Ex: Find the mesh currents shown in figure +2

8Ω ~~~
19IV
15V
4Ω ~~~ 6Ω ~~~
100V
3Ω
5Ω
7Ω
150V
74V
23V

Solution: $I_1 = -2A$, $I_2 = 4A$, $I_3 = -5A$

Ex: Use mesh analysis determine the power absorbed by the dependent voltage source in the circuit.

13Ω ~~~
14V
15Ω ~~~
20V 18Ω ~~~
+ −
20I_x
35Ω
$\downarrow I_x$
10V
7V
16V
11Ω
20Ω
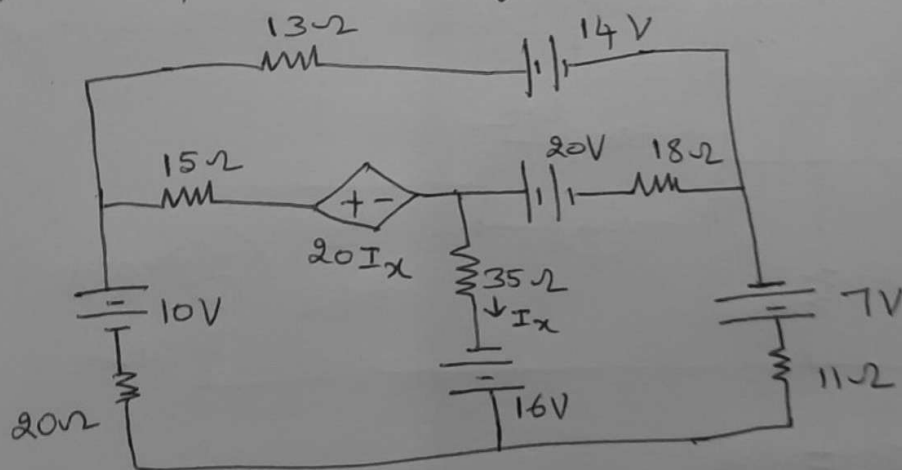
Solution: $I_1 = 0.148A$, $I_2 = -0.3A$, $I_3 = 0.256A$

$$P = -0.968 W$$

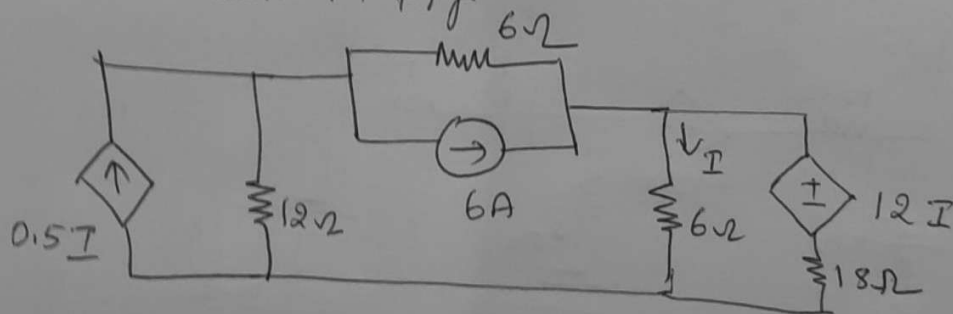Ex: Use mesh analysis in finding V_o in the circuit show

5Ω ~~~
10Ω ~~~
40Ω ~~~ $\rightarrow I_x$
+
6V_0
↑
1.5I_x
5Ω
V_0
−
20V
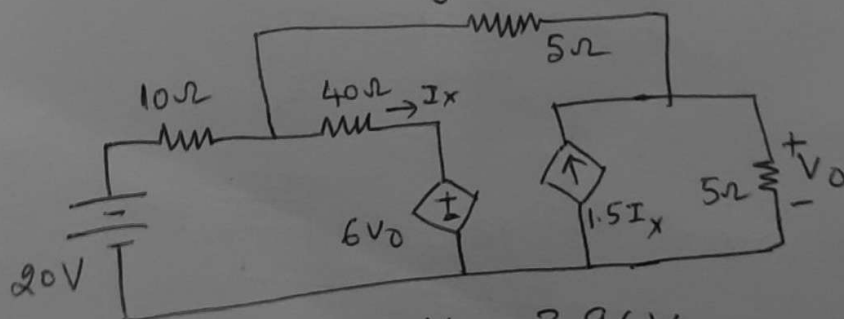
Ans: $V_0 = 3.96 V$

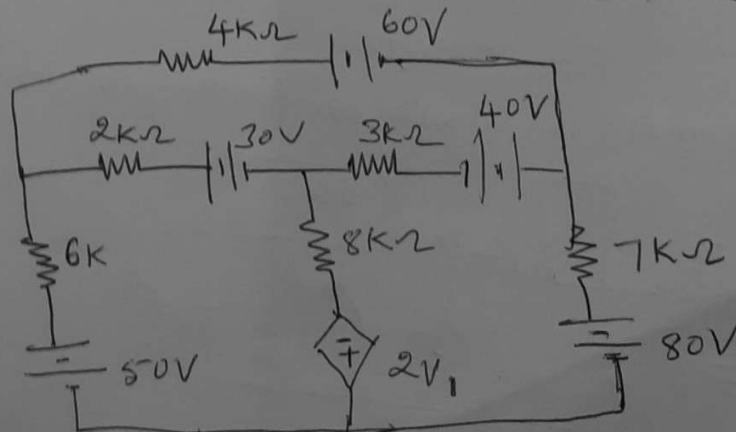Ex: use loop analysis to find the current flowing to through 5kΩ resister in the circuit Shown in Fig

1KΩ

2KΩ
5KΩ
4KΩ

26V

13KΩ
500Ω
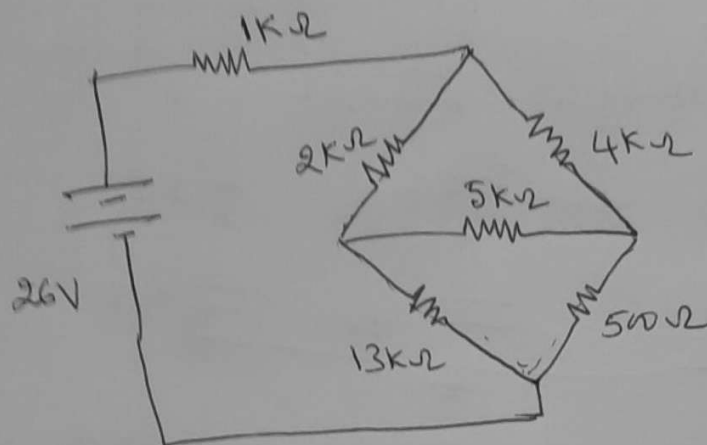
Ans: $I = 2mA$

Ex: use nodal analysis find I in the circuit Shown in fig

6Ω

$0.5 I$

12Ω

6A

$\downarrow I$

6Ω

$\pm$ 12 I

18Ω

Ans: $I ⩦ 3A$

Ex: obtain the mesh currents in the circuit Shown in Fig

4KΩ 60V

2KΩ 30V 3KΩ 40V

6K

8KΩ

7KΩ

50V

$\mp$ 2V₁

80V

Ans: $I_1 = -0.879 mA$, $I_2 = -6.34 mA$, $I_3 = -10.1 mA$

AC Source problems
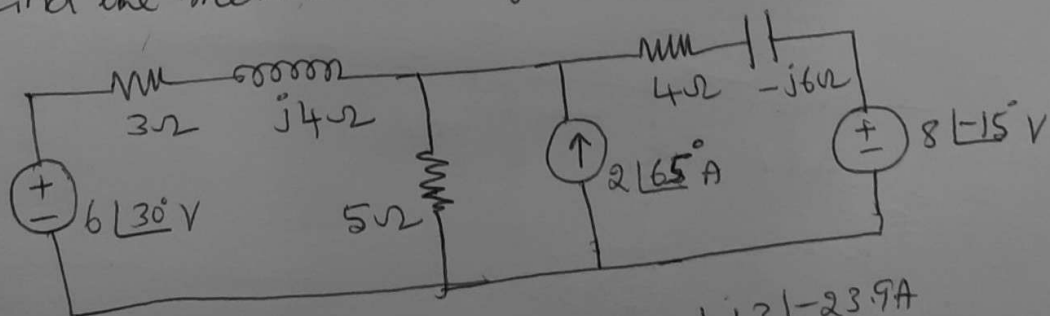
Ex: Find the mesh currents for the circuit shown in Fig

4Ω $j15\Omega$ $10\angle 20° V$

6Ω

$15\angle -30° V$ $3\angle -13° A$

$-j7\Omega$
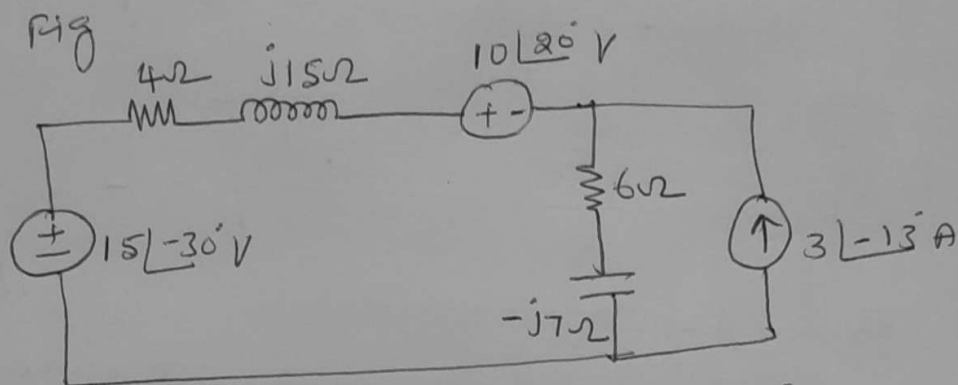
Ans: $I_1 = 1.28\angle 85.5 A$, $I_2 = -3\angle -13$

Ex: Solve mesh currents for the circuit shown in Fig

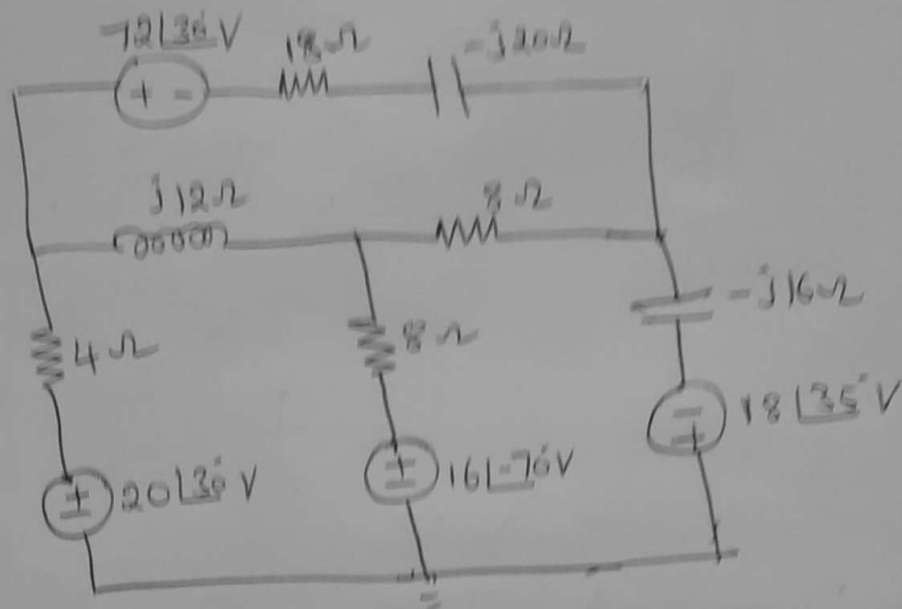8Ω $-j14\Omega$ 6Ω

4Ω $j10\Omega$

$10\angle 40° V$

$12\angle 16° V$
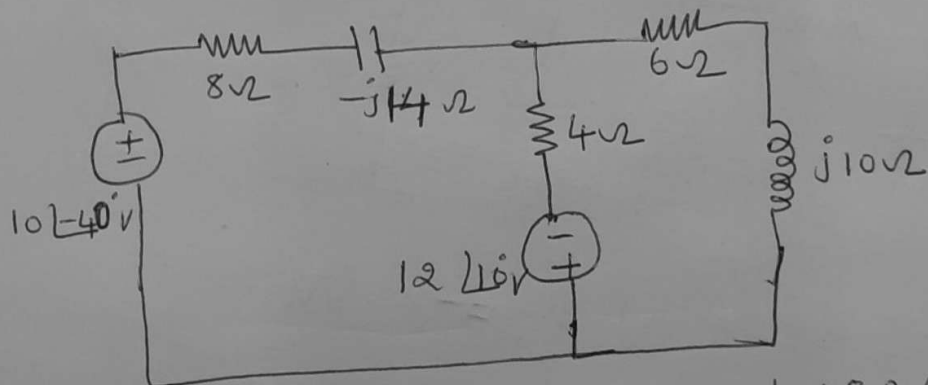
Ans: $I_1 = 0.974\angle 41.5 A$, $I_2 = -0.63\angle -48.2 A$

Ex: Find the mesh currents for the circuit shown in Fig

3Ω $j4\Omega$ 4Ω $-j6\Omega$

$2\angle 65° A$ $8\angle -15° V$

$6\angle 30° V$ 5Ω

Ans: $I_1 = -0.631\angle 15.6 A$, $I_2 = -1.13\angle -23.9 A$

$I_3 = -2.31\angle 35.9 A$

EX: Use mesh analysis to solve for the currents #6
in the circuit shown in Fig.

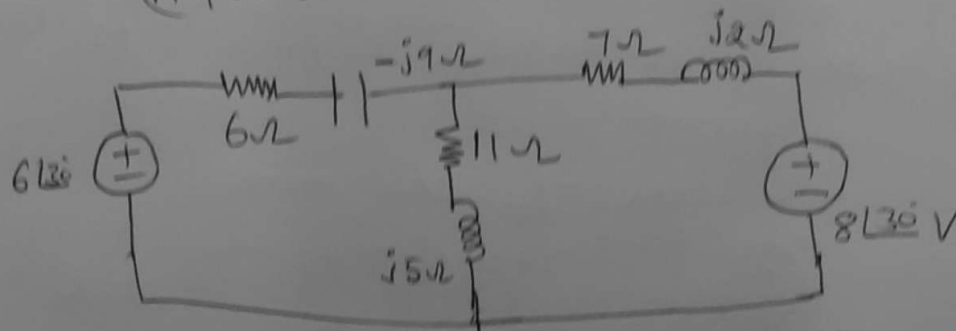ans: $I_1 = 2.07\underline{/-26.6}$ A , $I_2 = 1.38\underline{/7.36}$ A

$I_3 = 1.53\underline{/-146}$ A

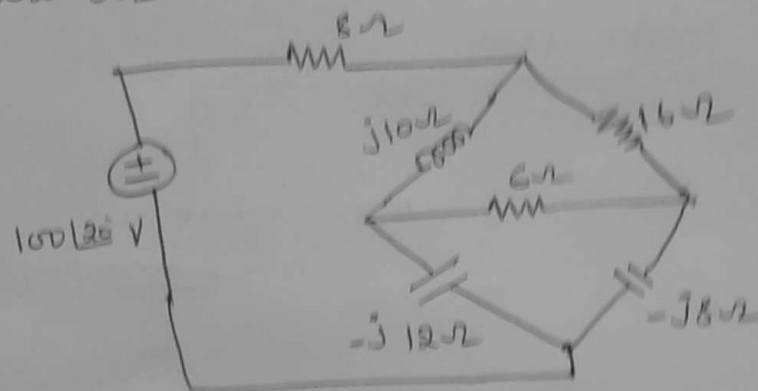EX: Show a circuit that corresponds to the
foll. mesh equations.

$$(17 - j4)I_1 - (11 + j5)I_2 = 6\underline{/36}$$
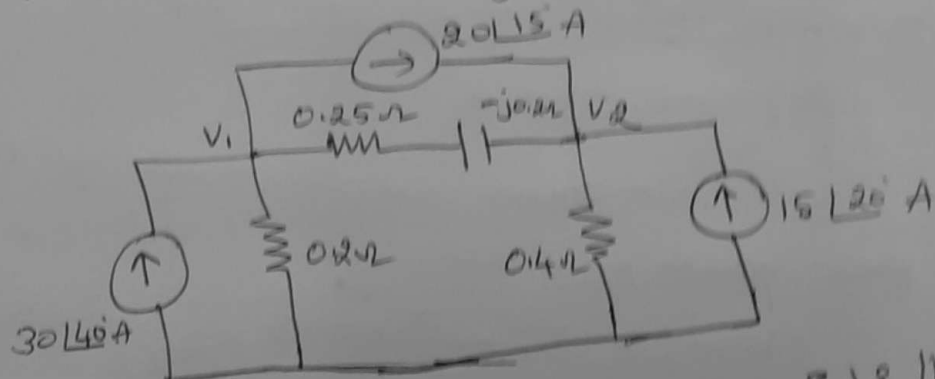
$$-(11 + j5)I_1 + (18 + j7)I_2 = -8\underline{/30}$$

ans.

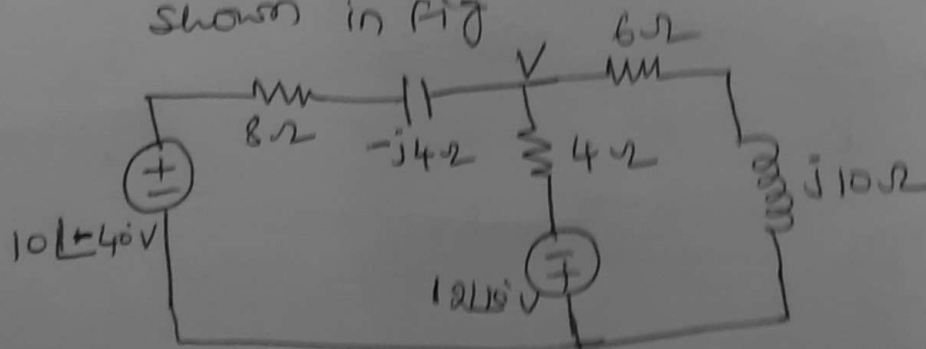Ex: use loop analysis to solve for the current flowing thro' 6Ω resistor in the ckt

ans: $I = 3.62 \angle{-45.8}$ A

Ex: Find the node voltages in the circuit shown in fig

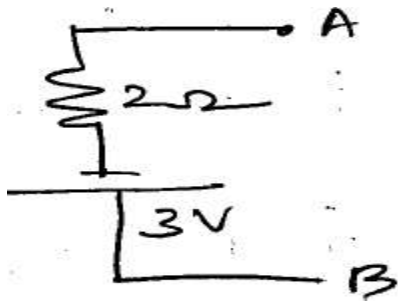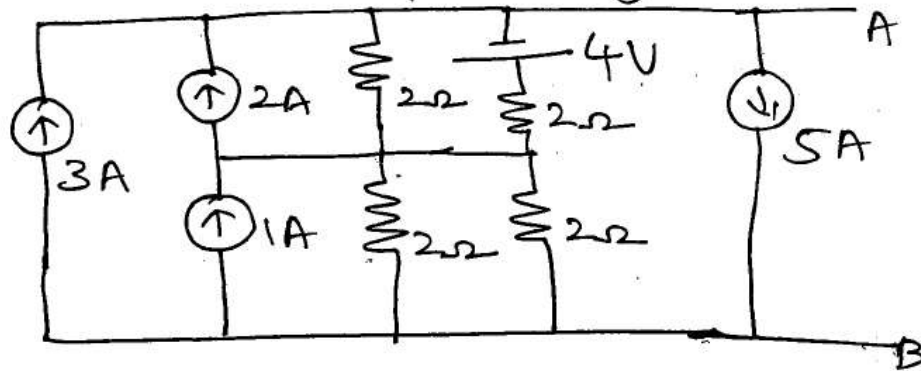Ans: $V_1 = 5.13 \angle{47.3}$ V and $V_2 = 8.18 \angle{15.7}$ V

Ex: use nodal analysis to find V for the circuit shown in fig

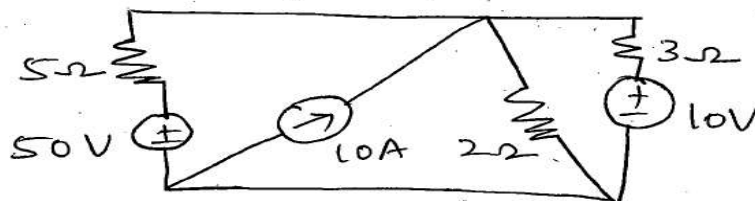Ans: $V = -7.35 \angle{10.8}$ V

Ex.

using source transformation technique reduce it in to a single source network
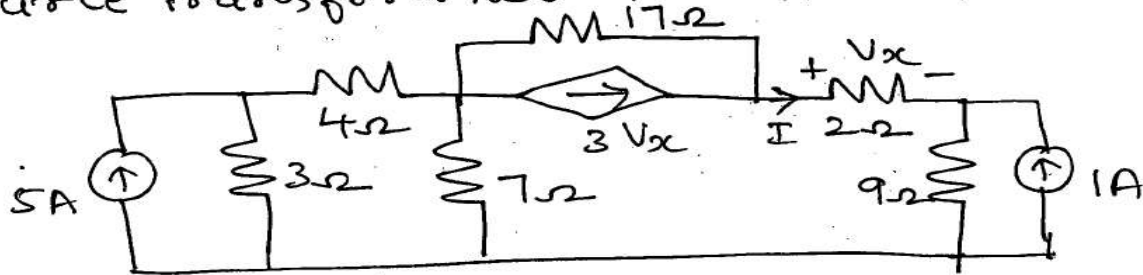

Ans:

Ex.

using source transformation technique find the power delivered by 50V source for the figure shown

Ans: P = 274.19. ω

Ex.

calculate the current through 2Ω
resistor for the circuit shown using
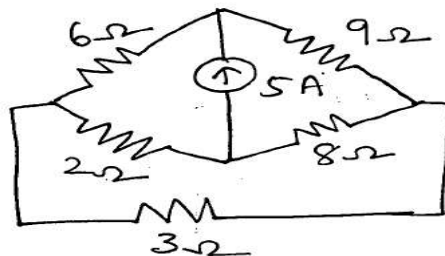source transformation

Ans:

Ex.

Reduce the network shown into a
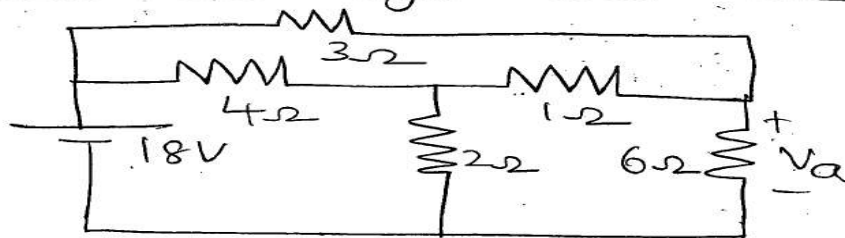single source network using source shifting
technique

Ans:

Ex.

Calculate the voltage across 6Ω
resistor using source shifting technique

Ans: $V_a = 9.23 V$