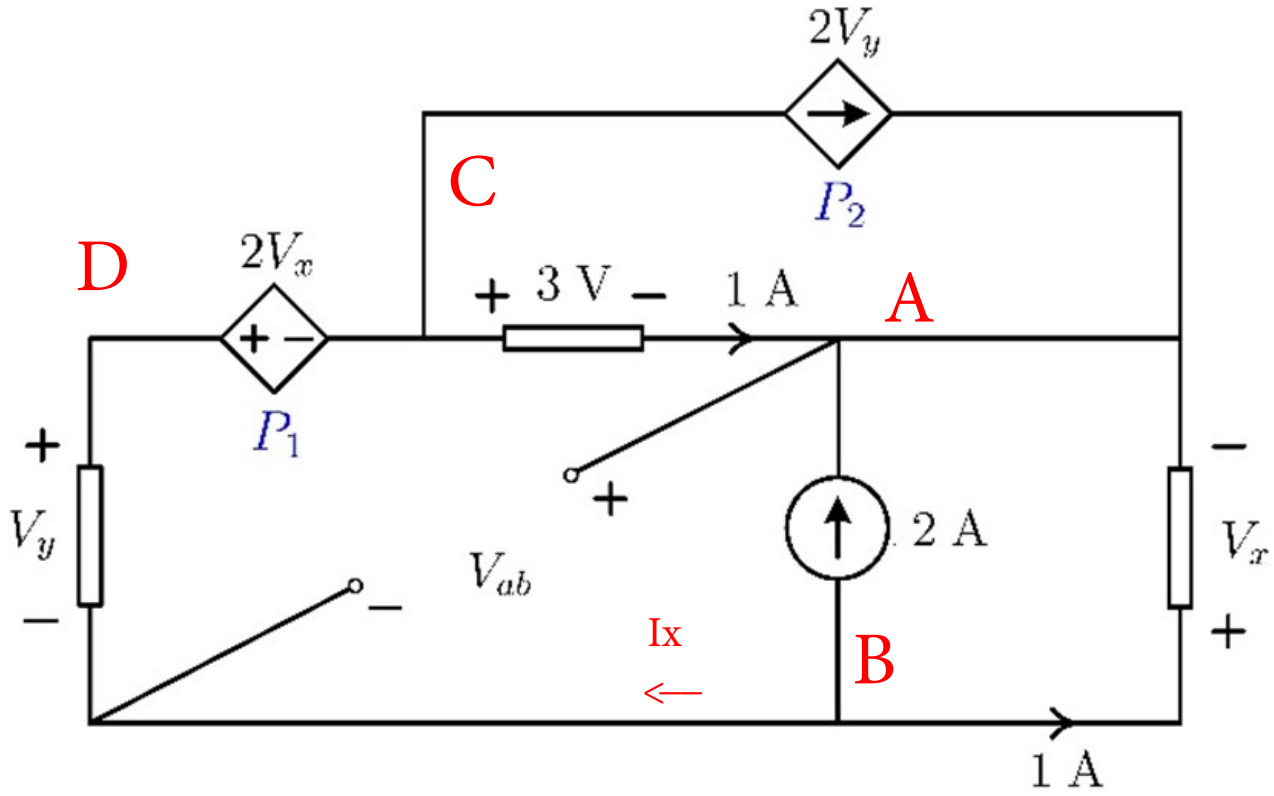
2.

For the circuit below, find the voltage V_{ab} and the power absorbed by each dependent source (P_1 and P_2 are the powers of the dependent voltage source and dependent current source, respectively). [6 points for correct answers, 19 points for process work]

V_{ab} = 5.00 ± 3% V
P_1 = 30.00 ± 3% W
P_2 = -12.00 ± 3% W



KCL @ A

Set current entering node as +

1 + 2 + 1 + 2Vy = 0

Vy = -2

2Vy element is in parallel with 3V element, so P2 is:

P2 = 3V * 2Vy = 3V*(-4A) = -12W

P2 = -12W

KVL around D->C->A->B loop

-Vy + 2Vx + 3 - Vx = 0

2 + 2Vx + 3 - Vx = 0

Vx = -5

Vab = -Vx = 5

Vab = 5V

KCL @ B

Set current exiting node as +

Ix + 2A + 1A = 0

Ix = - 3A

P1 = Ix * 2Vx = -3A * (2*-5V)

P1 = 30W