

Networks Practice Paper 1

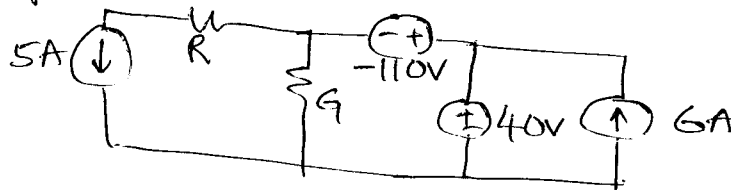
(On Basics, Voltage, Current, Power, Energy, Ohm's Law, Characteristics of elements/systems, KCL, KVL, Series, Parallel)

1. Find the current in a conductor through which 25×10^{20} electrons pass in 8s?
Ans: 5A.
2. A current of 6A flows in a resistor. How many Coulombs of charge pass thro' resistor in 2min.
Ans: $Q = 7200$.
3. An energy of 12J is expended in moving a 2-C charge from infinity to a point A. Assuming infinity to be at zero potential, determine the potential difference between point A and infinity?
Ans: 6V
4. If additional energy of 3J is expended to move 2-C charge of problem 3, from point A to another point B, Calculate potential difference between A & B.
Ans: 1.5V
5. Determine the charge that requires 1KJ energy to be moved from infinity to a point having a 12-V potential.
Ans: 33.33C.
6. A resistor draws a current $i = 8 \sin \omega t$ at a voltage $v = 200 \sin \omega t$ V. Calculate the energy consumed by the resistor per cycle. Hence, determine the average power dissipated in the resistor.
 $W = \frac{1600\pi}{\omega}$ J
 $P_{av} = 800$ W.
7. A cube of an alloy of resistivity $1.2 \mu\Omega \cdot m$ is 2cm on a side. Determine the resistance between any two faces of the cube?
Hint: $R = \frac{\rho l}{a}$ Ans: $R = 56 \mu\Omega$.
8. Calculate the length of the cu. wire having a diameter of 1.5875 mm. and resistance of 2Ω . Conductivity of Cu. is 58×10^7 S/m.
Ans: $l = 229.6$ m.
9. The minimum current required for the operation of a relay coil is 500mA @ 120V. If the current taken by the coil at $20^\circ C$ is 530mA (at 120V) and the temperature

16. Let $i = 3t - \frac{100t^2}{3t^2 e^{100t}}$ mA and $v = (0.006 - 0.6t) e^{-100t}$ V. for the circuit shown. a) find power absorbed by element at $t = 5$ ms. b) Energy delivered to the element in the interval $0 < t < \infty$.

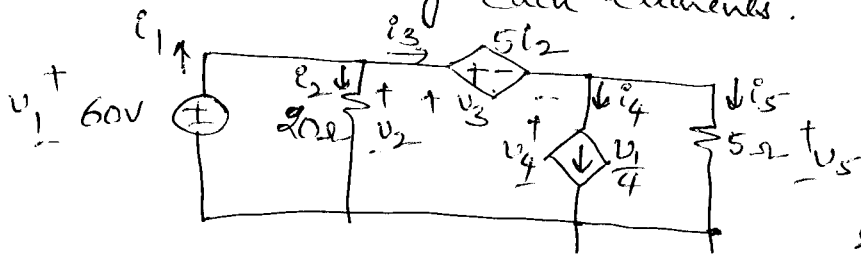
Ans: 16.55 mW ; 0. J.

17. Find R & G in the circuit of fig below, if 5A source is supplying 100W and 40V source is supplying 500W.



Ans: $34 \Omega, 0.075$.

18. a) Find all currents and voltages in the circuit below. b) Find power absorbed by each element.

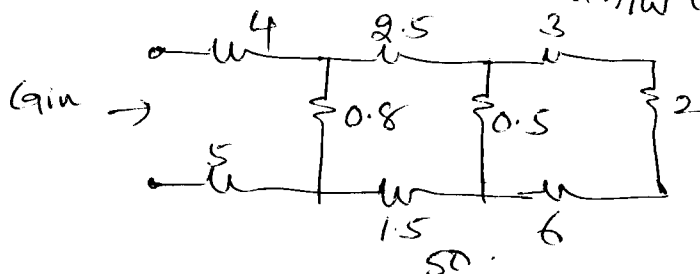


Ans: a) 60V, 60V, 15V, 45V, 45V,

$i_1 = 3A, i_2 = 2.7A, i_3 = 3A, i_4 = 2.4A, i_5 = 9A$.

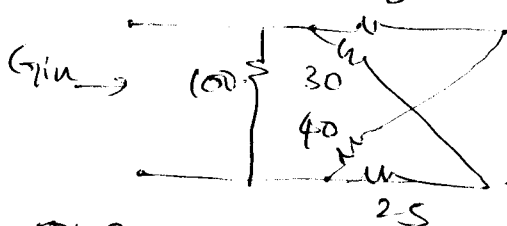
b) -1620W, 180W, 360W, 675W, 405W.

19. Determine G_{in} for each n/w below.



All values are given in mS

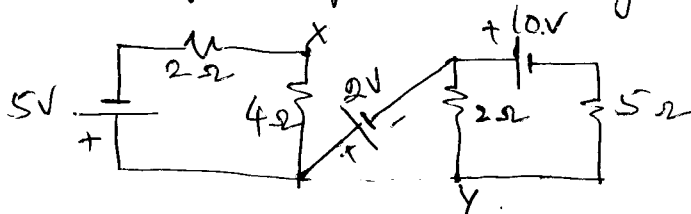
Ans: 0.850 mS



Ans: 135.9 mS.

20. A 50μF Capacitor is charged to retain 10mJ of energy by a constant charging current of 1A. Determine voltage across capacitor. Ans: 20V.

21. Find voltage drop across 2-2' terminals.

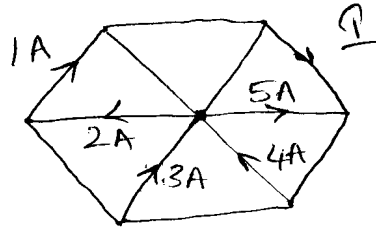


Ans: 1.524V.

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co-efficient of the resistor material is $0.00427^{\circ}\text{C}^{-1}$ at 0°C , calculate the max temperature above which relay will fail to operate. $[R_t = R_0(1 + \alpha T)]$ — Ans: 35.26°C

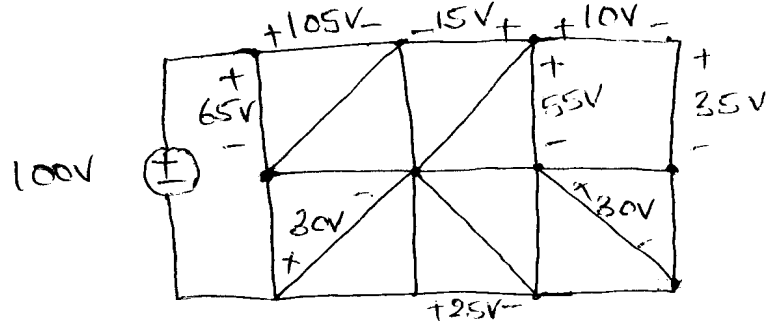
10. Determine I .



Ans: 1A.

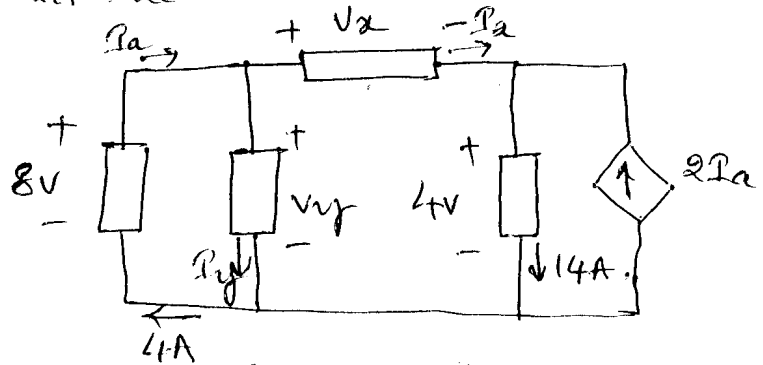
11. Find $V_1 = ?$

Ans: 15V.



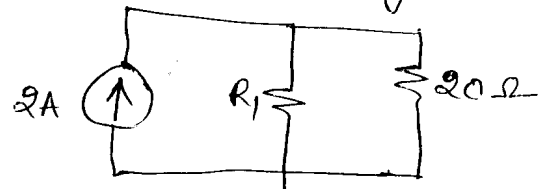
12. Find I_a, V_a, I_y, V_y in the circuit

Ans: 8, 6, 4, 2

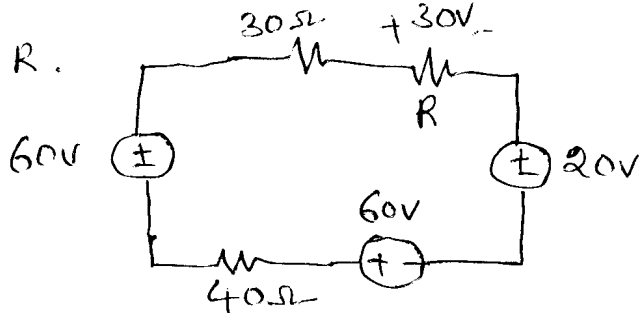


13. Find the value of R_1 , so that power delivered by source is 60W for the circuit of fig. below.

Ans: $40\Omega \leq R_1 \leq 70\Omega$

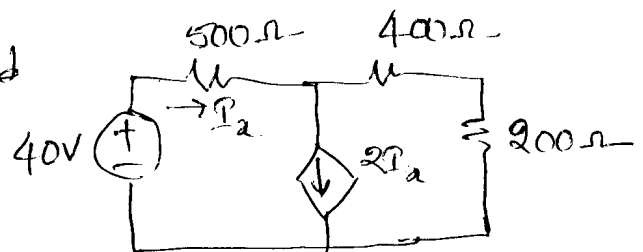


14. Find R.

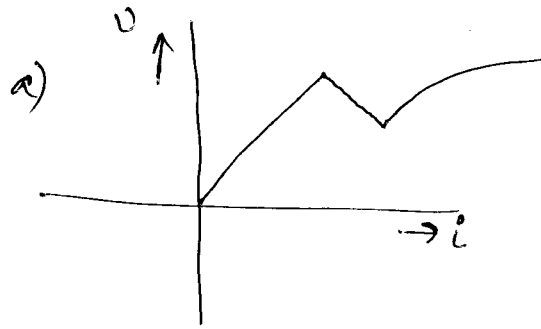
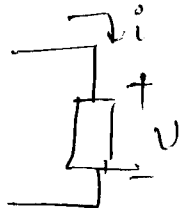


Ans: 30Ω.

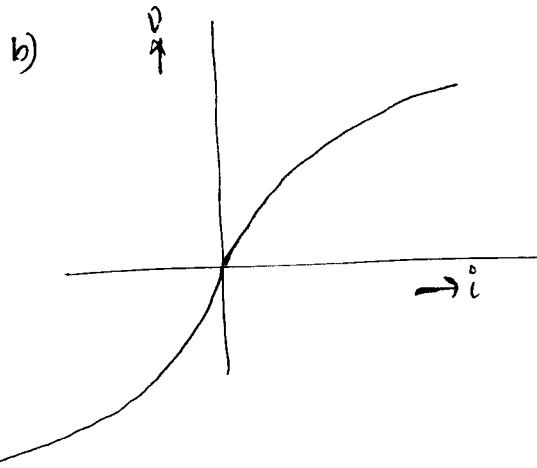
15. Find a) I_2 , b) Power delivered by independent source
c) Power delivered by dependent source.



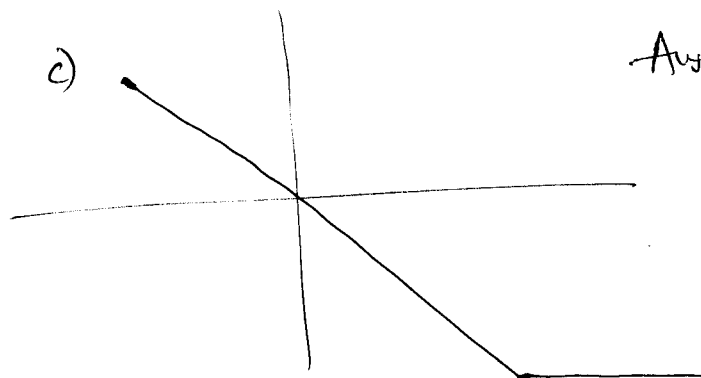
21. Which type of two-Terminal System is this? in Terms of linear/non linear, Active/passive, Unilateral/Bilateral.



Ans: Active, Unilateral,
Nonlinear



Ans: Nonlinear, Bilateral,
Passive



Ans: Unilateral, Active,
Nonlinear.

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