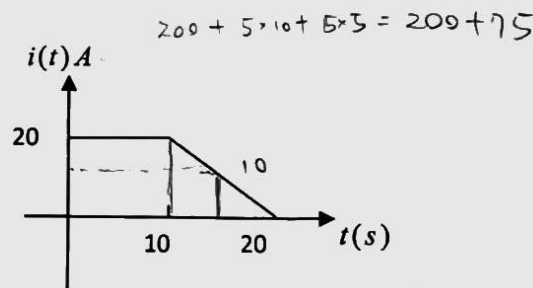


1. (14%) Please give the answer for the following statements. State your reasoning.
 - (1) In a series circuit, each resistor has the same voltage.
 - (2) For a graph, what is a tree? A tree is also a loop. (true or false)
 - (3) A network with a branches, and b independent loops, and c nodes will satisfy the fundamental theorem of network topology: $a = b + c - 1$. (true or false)
 - (4) Kirchhoff's current law can state that the algebraic sum of currents entering a closed boundary is zero. (true or false)
 - (5) Nodal analysis applies KCL to find unknown currents in a given circuit, while mesh analysis applies KVL to find unknown voltages. (true or false)
 - (6) A mesh is a dependent loop. Also, the mesh current is equal to the branch current. (true or false)
 - (7) In many circuit applications, components are connected together in one of two ways to form a three-terminal network: the "Delta" configuration, and the "Wye" configuration. Please plot two circuits to represent the "Delta" and "Wye" configuration, respectively.
2. (5%) The current that enters an element is shown in Fig. 1. Find the charge $q(15)$.



3. (12%) For the circuit in Fig. 2, (1) if $R = \frac{1}{2} \Omega$, then how much the power will be absorbed by the R ; (2) find the resistance R so that the power absorbed by R is equal to that of the voltage source 4V delivered.

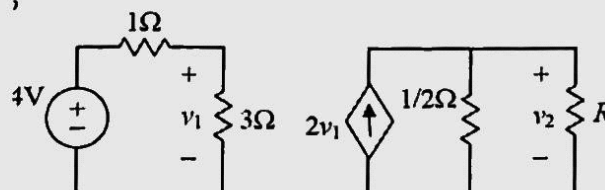


Fig.2

4. (15%) For the circuit in Fig. 3, please transfer the network into a graph, and find the nodes, branches, loops, meshes and its adjacency matrix A .