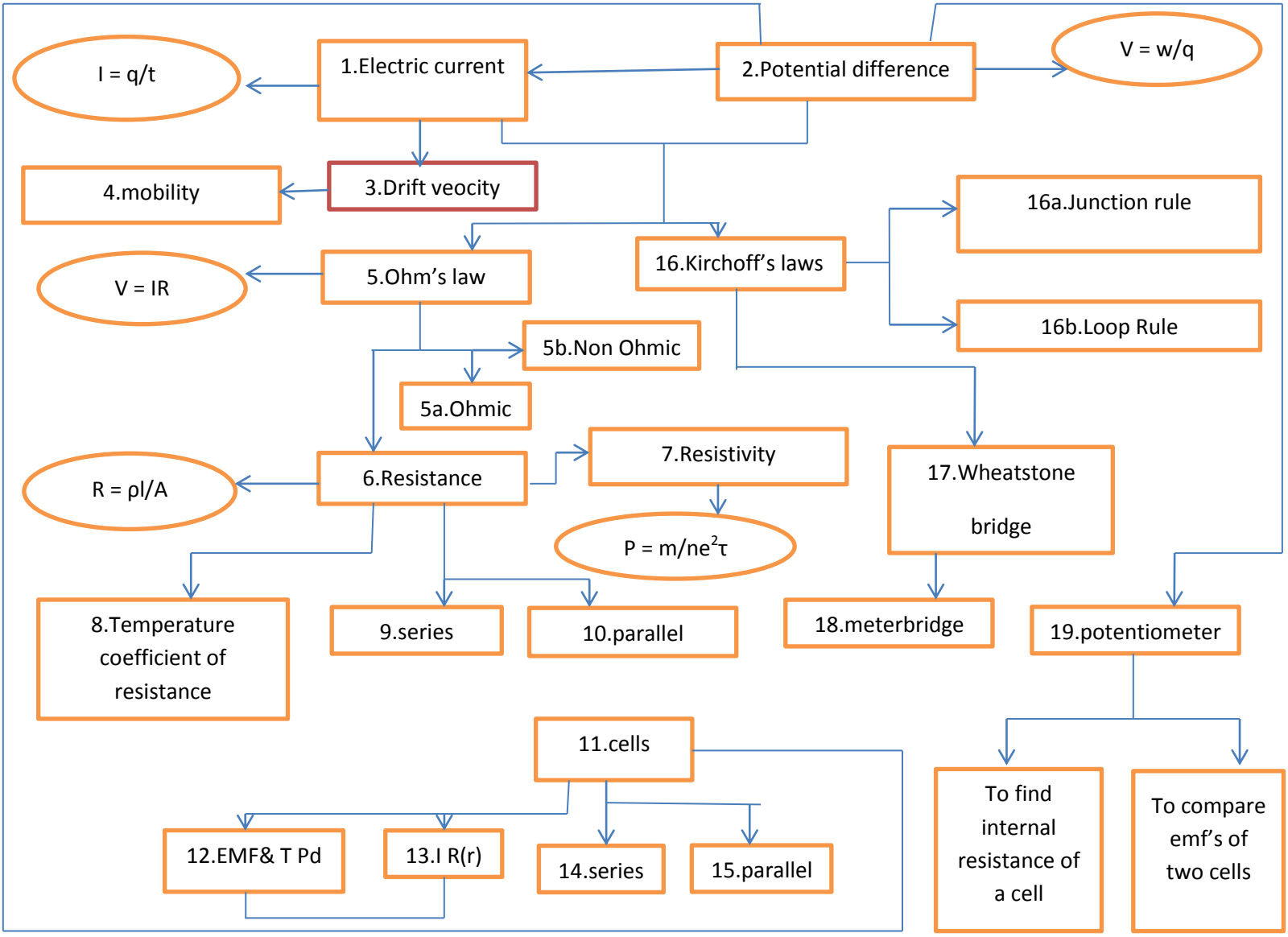
CONCEPT MAP
CURRENT ELECTRICITY



Gist of the chapter
Current Electricity

1. It is the rate of flow of charge
2. It is the work done per unit charge
3. It is additional small velocity imparted to an electron in the presence of electricfield.
4. It is drift velocity per unit electric field
5. **Ohm's laws:** The current flowing through a conductor is directly proportional to the potential difference across its ends
   5a. Materials which obey Ohm's law ex., metals
   5b. Materials which do not obey Ohm's law ex., diodes, transistors
6. The opposition offered by a material to the flow of charge. It depends on dimensions and nature of the material. It also depends on temperature
7. It is the resistance of a material of a cube of unit side. It depends on the nature of material and temperature and does not depend on dimensions
8. It is the change in resistance per unit resistance per degree rise in temperature.
9. The equivalent resistance in series combination is equal to the sum of the individual resistances.
10. The reciprocal of net resistance in parallel combination is sum of the reciprocals of the individual resistances.
11. It is a device which maintains potential difference between two ends of a circuit.
12. EMF is the potential difference between its ends when the circuit is open. It is denoted by E.
    Terminal potential difference is the potential difference between the terminals of a cell when the circuit is closed. It is denoted by V.
13. Internal resistance is the opposition to the flow of charge by the ions of an electrolyte. It is denoted by r.
    Relation between E, V and r is **$E - V = Ir$**
14. The net emf of two cells in series is
$$E_s = E_1 + E_2$$
15. The net emf of two cells in parallel is
$$E_p = \frac{E_1 r_1 + E_2 r_2}{r_1 + r_2}$$
16. **Kirchoff's laws**: These laws are used to solve problems in electrical network.
    16a. Junction Rule: The algebraic sum of currents at a junction is zero
    16b. Loop Rule: The algebraic sum of changes in potential in a closed loop is zero.
17. It is an arrangement four resistors in the form of a quadrilateral in which a galvanometer and a cell are connected across the junctions. When the bridge is balanced, the ratio of reistances are equal.
18. Meter bridge works on the balanced condition of whea tstone bridge. It is used to measure the resistance and hence resistivity of a given material.

19. It is a device used to measure the internal resistance of a cell and to compare the emfs of two primary cells. The principle on which potentiometer works is “ the potential drop across the ends of a wire s proportional to the length of that portion when a constant current flows through a wire of a given material of uniform area of cross-section”.