

TITLE : TEMPERATURE MEASUREMENTS WITH THERMO COUPLES

2.0 OBJECTIVE : To make thermocouples (single, integral and differential) and calibrate them from room temperature to the boiling water temperature.

3.0 THEORY

3.1 Seebeck Effect

A voltage is generated in a circuit consisting of dissimilar metals if the two junctions of the metal wires or strips are maintained at different temperatures.

The factors relating the electromotive force (emf) and the temperature difference which cause the emf is referred to as the Seebeck Coefficient and its value depends on the combination of the materials making up a thermocouple. Thus a thermocouple is made up of 2 dissimilar metal wires which are welded together at one end called the hot junction. The other end, called the cold junction, is connected to a millivoltmeter, galvanometer or potentiometer for measuring the emf values in (mV). The cold junction is usually maintained at 0°C in a dewar flask and it is often connected to the measuring instrument by extension wires.