**CSEC Physics Handout**

**Topic:** Macroscopic Properties & Phenomena

1. Temperature, T

Temperature is a property of an object. The temperature of an object determines the direction of net heat flow when the object is placed in contact with some other object. At the molecular level, the temperature of a body is a measure of the average kinetic energy of the molecules of the body [this concept is further developed in the kinetic theory]. Temperature then, is a measure of the degree of hotness of the body expressed on a suitable scale. If a brass rod is made hot at one end by placing it in a Bunsen flame while the other end is kept away from the flame at room temperature, there is a net transfer of energy from the hot, high temperature end to the cool, low temperature end.

*Measuring Temperature*

A changing temperature can cause certain physical properties of substances to vary. These properties include:

1. Volume of a liquid or gas e.g. alcohol (or mercury) or air
2. E.m.f. between the ends of two different wires joined together
3. Electrical resistance of a metal e.g. platinum
4. Pressure of a constant volume of gas

For most substances these properties are known to vary continuously with temperature and so may be used as a basis for measuring temperature as with the mercury-in-glass thermometer, the thermocouple thermometer and the platinum resistance thermometer.

In order to express temperatures a scale and a unit of temperature are necessary. A temperature scale can be set up by arbitrarily choosing two reproducible but defined temperatures (called fixed points) in relation to which values of measured temperatures can be expressed.

On the Celsius scale the lower fixed point is the temperature of pure melting ice at standard pressure. It is designated as 0° C. The upper fixed point is the temperature of the steam above water boiling at normal atmospheric pressure. It is designated 100° C. At this level, these fixed points can be acceptably reproduced and used by setting up appropriate apparatus.