

MEASUREMENT AND UNITS Dr. Auday K. 4/22/2024 DR. AUDAY K.A. 1 Measurement is a technique by means of which we attach a number to a physical or chemical property as a result of comparing it, with a similar, standard, quantity that has been adopted as a unit. Measurement units of dimensional quantities Units dimensions (Numerical value) 4/22/2024 DR. AUDAY K.A. 2 A number indicates "how much," but the unit indicates "of what." The "of what" is important when communicating a quantity. Amount of Substance mole mol UNIT PREFIXES In addition to the basic SI units, we can also use other units, such as millimeters and nanoseconds, where the prefixes milli- and nano- denote various powers of ten. The measurement of physical or chemical quantities requires: 1) The standard or unit in which the quantity is measured. MEASUREMENTS FUNDAMENTAL AND DERIVED UNITS The physical quantities which do not depend upon other quantities are called fundamental quantities (in M.K.S.C. system the fundamental quantities are length, mass, time and charge). M.K.S.C. System: In this system the units of length, mass, time and charge are meter (m), kilogram (kg), second (s) and charge (c) respectively. 2) The numerical value representing the number of times the quantity contains that unit. 4/22/2024 DR. AUDAY K.A. 3 PRINCIPAL SYSTEMS OF UNITS C.G.S. System: In this system the unit of length is cm, that of mass is gm and that of time is second. S.I. System (International System of Units or Metric system): In this system there are seven fundamental quantities whose units and symbols are given in a table. The units of physical or chemical quantities which may be derived from fundamental units are called derived units. F.P.S. System (The British System): In this system the unit of length, mass and time are foot (f), pound (lb) and second (s) respectively. 4/22/2024 DR. AUDAY K.A. 4 S.N. Fundamental quantity Unit Symbol 1. Luminous Intensity candela cd 6. The units of fundamental quantities are called fundamental units. Length meter m 2. Mass kilogram kg 3. Temperature kelvin K 5. Electric Current ampere A 7. Time second s 4.