# Research Project on Scientific units of measurement

****Task****:

a) What is the International system of Units (SI)?

b) List and define the 7 base SI units that are used as building blocks for all other derived units. give some examples.

c) Look fot two different tools, software, websites or mobile apps that can convert between different units. Discuss their potential use in education.

d) Write about traditional units that were used in the past in the UAE. you can describe any type of units used in the past.

## Answer

****Introduction****

A unit of measurement is widely acknowledged as a definite magnitude of quantity and it is defined and adopted by convention and sometimes by law as well. It is used as a standard for measurement of the same type of quantity and any other quantity is measured in respect to that specified measured unit. The report attempts to shed light on the international system of units. Two different tools which are used for conversion into SI unit are evaluated along with a prior discussion on the traditional units which used to be followed previously in UAE.

****International system of units****

The international system of units which is often abbreviated SI from the French *system international,* is considered by the experts as a scientific method of expressing the magnitude of different important natural phenomenon. The system has seven base units and other units are derived from these units. This system was previously known as the meter-kilogram-second system or the MKS system (Janna, 2014).

All SI units are usually expressed in terms of the standard multiple and fractional quantities and sometimes directly as well. Multiplied and fractional SI units are widely denoted through prefix multipliers in accordance with the powers of 10. The range that is used is from 10-24 to 1024.

****Reason of adopting by the scientific community****

At the time of increasing international trade and cooperation it became significant to have an internationally recognized system of units. Due to the emergence international trade, the internationally recognized system of measurement became potently significant. The advantage of having a internationally acknowledged unit system is to have a common base for the scientific, industrial and scientific exchange (Kumar, 2014). It is necessary to have a common system of measurement in order to foster the prosperous growth of consciousness of approaching several issues from a global perspective.

Looking at the history, it is found that, the metric system had been officially adopted after the French revolution by the French. The number of variations have evolved to serve the purpose of the need during the history of Metric system (Kumar, 2014). By the end of the World War II a number of different systems of measurement were in use all over the world. Some of the widely used measurement systems were based on the imperial and the American systems of measurement and most of the measurement systems were metric system variations.

****List and definition of 7 base SI units****

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| --- | --- | --- |
| unit of length | meter | The meter is considered as the length of the path that is   travelled by light in vacuum during a time interval of 1/299729458 second   (Milton, 2014) |
| unit of mass | kilogram | The kilogram is considered as the unit of mass and it is   equal to the mass of the prototype of kilogram. (Milton, 2014) |
| Unit of time | second | The second is considered as the duration of 9192631770   periods of the radiation corresponding to the transition between the two   hyperfine levels of the ground state of the cesium 133 atom. (Milton, 2014) |
| Unit of current | ampere | The ampere is considered as that constant of current which   is if maintained in two straight parallel conductors of infinite length that   has negligible circular cross section and when placed 1 meter apart in the   vacuum, would produce between these conductors a force which is equal to 2 X   10-7 newton per meter of the length. (Milton, 2014) |
| Unit of thermodynamic temperature | kelvin | The Kelvin which is the measuring g unit of thermodynamic   temperature is considered as the fraction 1/273.16 of the thermodynamic   temperature of the triple point of water. (Milton, 2014) |
| unit of amount of substance | mole | The mole is the amount of a substance of a system which   contains as many elementary entities as there are atoms in 0.012 kilogram of   carbon 12. (Milton, 2014) |
| Unit of luminous intensity | candela | The candela is the unit of the luminous intensity and it   is measured when it is in a given direction, of  a source that emits monochromatic radiation   of frequency 540 X 1012 hertz and which has a radiant intensity in   that direction of 1/683 watt per steradian. (Milton, 2014) |

****Tools of converting units****

There are several applications that are available in the market for converting units. In order to understand the feasibility of the tools this study will discuss two different android applications that have the capability of acutely convert different units into required form (Narayanan, 2016). There are several unit converters that are available in the android market which has different features and some of them are appropriate for educational purpose.

It is important to note that different converting apps have different features and their price also vary to a large extent. Some of these tools are high priced and can not be afforded by the students. Two of the widely used converting mobile applications are:

* ****Ultimate converter****

Ultimate converter is widely used by students all over the world. It is one of the simplest yet most elegant unit converters available in the market.

****Features:****

a. It supports 250 different units in total 18 categories but currently it has 17 categories after currency conversion got disabled.

b. It has a dark grey theme and the categories are well classified into different categories and icons.

c. It has buttons that can be easily understood and can be swapped “to” and “from” fields.

d. It does not support negative values.

e. This application is free and easily available as it can be downloaded from the Google playstore.

* ****Simple converter****

Simple converter is one of the simplest converter applications that are available in the market. There are few classifications and only six categories of measurement for conversion.

****Features****:

a. There are six categories for conversion and few units each.

b. These categories are easily accessible with one click on the button.

c. The units can be swiped from left to right in order to reveal more options of each category.

d. It does not support negative calculations.

****Application in education****

These applications are the primary tools that the students can use for complicated calculations as it saves time. These applications are free and easily available. Therefore, it can be used by the students for their educational purposes.

****Traditional units used in the past in UAE****

Traditionally UAE used to follow a mixed system that is combined of metric and imperial measurements. The ancient Arabic units of measurement have been followed in the UAE for a long time. In this unit system the unit measurement is different from the SI unit and in this system FPS is used as the measurement tools (Sikdar, 2013). FPS is considered to be the Imperial system that was implemented as the measurement units of the countries that were part of the British empire. It is important to understand the difference of measurement in this system. In Imperial system Foot is considered as the standard unit for measuring length, pound for measuring mass and Second for measuring time.

However the units that were followed by UAE had different names and standard measurement. The units that had been used in measuring the length are cabda, Arabic foot, dira, orgeye, qasab, seir, ghalva, parasang, barid and marhala.

As a part of the Ottoman Empire several regions have different metric system. Awqiyyah is the measuring unit that is similar to ounce or pound. Awqiyyah is Arabic ounce or half pond and the measurement varies from one region to other.

Qafiz is another unit that has been widely used in the Arabic unit system and this unit is used in the measurement of volumes.

The Arabic mile or al-mil is a unit that is employed by the Arab geographers and scientists. The scientific units of the country varied widely from the international unit system. 1 cabda is 1/4 arabic Foot which is closer to 9 cm (Narayanan, 2016). Arabic foot is closer to 32 cm. Dira equals to 2 arabic feet and later it was considerd to be 1.5 arabic feet which is a cubit length. Orgye equals to 6 arabic feet or 1.92 meter which is the length of a pace.

Qafiz is a traditional Arabic unit which is used in order to measure various quantities which are volume, weight and area. It is consisted of different values which are dependent on the time nad the region.

It is important to understand that the metric systems that are used in different countries have different origins. The unit system that was followed by UAE was the traditional Arabic unit system then the unit system shifted to the Imperial metric system that has been followed b y the British invaded countries. Currently in order to facilitate the process of global business and corporate the international unit system or the  SI unit system.

****Conclusion****

In the light of the above study it is evident that it is important to have a global standard o measurement in order to avoid the possible confusion of measurement. Implementing one single globally acknowledged measurement system helps in the business process and scientific calculations as well.