3ª Lista de exercícios – ACA 0115 – Introdução às Ciências Atmosféricas

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1 – Cite as unidades fundamentais do Sistema Internacional de Unidades (MKS) para as seguintes variáveis:

a) distância

b) massa

c) tempo

d) temperatura

2 – Transforme:

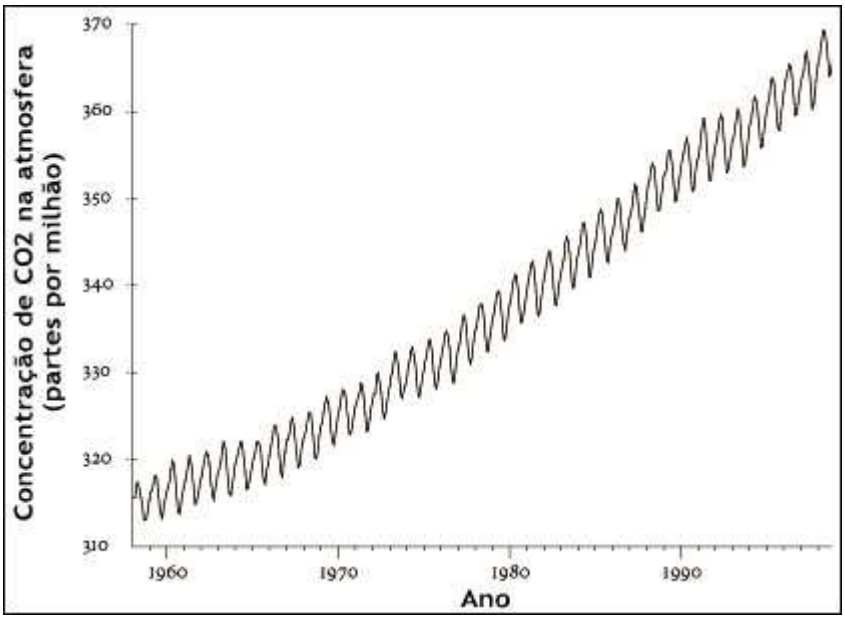
a) m/s em km/h

b) 1 litro de água para m^3

c) 15^{o}C em ^{o}F e K

d) 500 mb em hPa

3 – A clássica figura abaixo mostra medições da concentração de gás carbônico no observatório de Mauna Loa, no Havaí. Responda:



a) O que tem acontecido com a concentração de gás carbônico ao longo dos anos? Quais são os principais fatores responsáveis por esta tendência?

b) Em quais épocas do ano se observam maiores e menores concentrações de gás carbônico e por quê?

4 – Leia o texto abaixo e responda:

Focus on AN OBSERVATION

The Radiosonde

The vertical distribution of temperature, pressure, and humidity up to an altitude of about 30 km can be obtained with an instrument called a radiosonde.* The radiosonde is a small, lightweight box equipped with weather instruments and a radio transmitter. It is attached to a cord that has a parachute and a gas-filled balloon tied tightly at the end (see Fig. 4). As the balloon rises, the attached radiosonde measures air temperature with a small electrical thermometer—a thermistor—located just outside the box. The radiosonde measures humidity electrically by sending an electric current across a carbon-coated plate. Air pressure is obtained by a small barometer located inside the box. All of this information is transmitted to the surface by radio. Here, a computer rapidly reconverts the various frequencies into values of temperature, pressure, and moisture. Special tracking equipment at the surface may also be used to provide a vertical profile of winds.† (When winds are added, the observation is called a *rawinsonde*.) When plotted on a graph, the vertical distribution of temperature, humidity, and wind is called a *sounding*. Eventually, the balloon bursts and the radiosonde returns to earth, its descent being slowed by its parachute.

At most sites, radiosondes are released twice a day, usually at the time that corresponds to midnight and noon in Greenwich, England. Releasing radiosondes is an expensive operation because many of the instruments are never retrieved, and many of those that are retrieved are often in poor working condition. To complement the radiosonde, modern geostationary satellites (using instruments that measure radiant energy) are providing scientists with vertical temperature profiles in inaccessible regions.

*A radiosonde that is dropped by parachute from an aircraft is called a *dropsonde*.
†A modern development in the radiosonde is the use of satellite Global Positioning System (GPS) equipment. Radiosondes can be equipped with a GPS device that provides more accurate position data back to the computer for wind computations.

Figure 4
The radiosonde with parachute and balloon.

a) O que é e para que serve uma radiossonda?

b) Cite três variáveis meteorológicas que podem ser medidas com a radiossonda e explique como ocorrem suas medições.

c) O que é uma sondagem meteorológica?

d) Qual é a principal desvantagem para a utilização da radiossonda?

5 – Qual foi a influência do pós-guerra no desenvolvimento da meteorologia?

6 – Qual a importância da escola norueguesa no desenvolvimento teórico da meteorologia?