AGS 2110

INTRODUCTION TO SOIL SCIENCE

ASSIGNMENT NO 2- SOIL PHYSICAL PROPERTIES

November 20120

Answer all question: **Marks: 100**

Due: December 2, 2020

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1. Answer the following. (25 marks)

    a. How many micrometers are present in 10 Megameters? (2.5 marks)
    b. In a 15 kilometer race how many nanometers are the contestants expected to run? (2.5 marks)
    c. Express 2.5 hectare in square inches, given than 1 inch = 2.541 cm. (5 marks)
    d. Express 300 cubic metres in milliliters (5 marks)
    e. How many kilograms of oven dry soil with a bulk density of 1.45 $g.cm^{-3}$ would occupy a 10 m^2 area to a depth of 25 cm? (10 marks)

2. A soil has an A horizon 10 cm deep, that contains 18.3 % clay, 3.7 % silt and 78.0 % sand in its fine earth fraction, has a particle density of 2.65$g.cm^{-3}$, a dry bulk density of 1.44 $g.cm^{-3}$ and a gravimetric moisture content of 11.6 % at field capacity. Answer the following. (75 marks)

    a. What is the textural class of this soil? (5 marks)

    b. When is the total depth of water in mm present in this soil horizon at field capacity? (5 marks)

    c. What is the maximum depth of water in mm that this soil can contain? (7.5 marks)

    d. What is the degree of saturation of the soil when it is at field capacity? (7.5 marks)

    e. If the volume of oxygen in the soil air is 19 %, how many litres of oxygen are present in one hectare of the soil layer when it is at field capacity? (15 marks)

    f. How many litres of water are present in 1 hectare of this soil horizon when it is at field capacity?

    (10 marks)

    g. If this horizon, losses water by evapotranspiration at a rate of 4 mm H_2O per day, how long (in days) will it take for the moisture content to drop from field capacity to a volumetric moisture content of 5 %? (15 marks)

    h. If the soil contains 7.5 % gravel, 92.5 % fine earth material, and has the distribution of sand, silt and clay described above, what area of this horizon is required to obtain 30 metric tonnes of sand? (10 marks)

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