Monday, March 26, 2012

Time Limit: 120 Minutes

Instructor: Dr. Wa'el M. Albawwab

University of Palestine

College of Applied Engineering & Urban Planning

ECGD3216 Soil Mechanics

Open-Book Mid-Term Exam

Answer All Questions

Q1- For an inorganic soil, the following grain-size analysis is given: **(9 Marks)**

% Finer	100	88	67	40	19	11
Sieve No.	4	10	20	40	80	200

For this soil, LL = 24 and PL = 18.

a) Classify the soil according to the AASHTO system

b) Determine the corresponding classifications according to the USCS

c) Determine the percentages of gravel, sand, silt ,and clay, according to the USDA

d) Determine the suitability number and rating for this soil as a backfill material

e) Explain the expected behavior and suitability of this soil as a backfill material

Q2- A 6 ft deep uncompacted sandy fill has a relative density of 0.42. Laboratory tests indicated that the specific gravity and the minimum and maximum void ratios of this soil are: 2.68, 0.45, and 0.88, respectively. If this soil is compacted to a relative density of 75%, what is the decrease in thickness of the sandy fill? **(4 Marks)**

Good Luck

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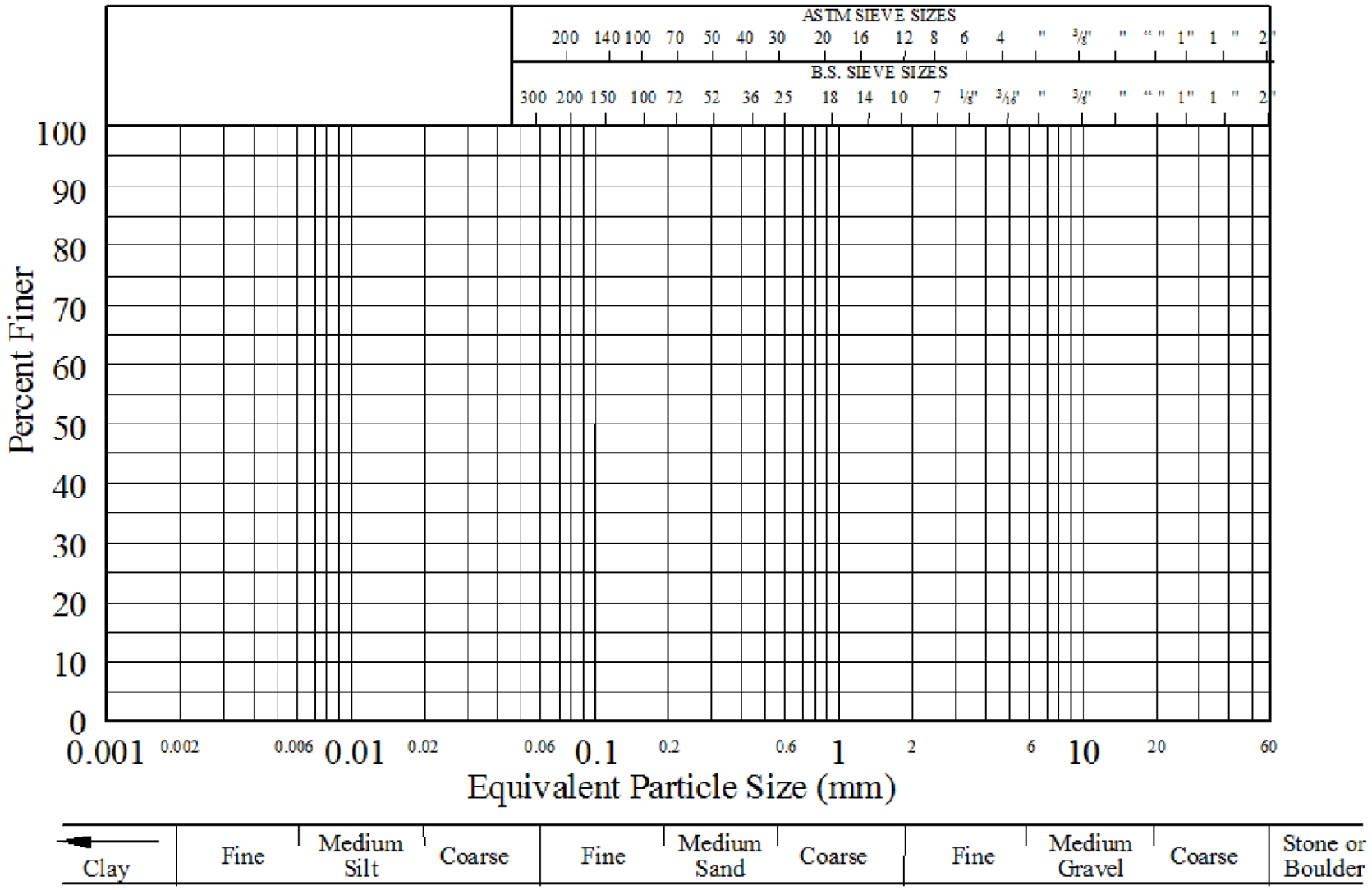
Open-Book Mid-Term Exam - Continued

Q3- A saturated sample has an initial volume of 19.65 cm^3, a final volume of 13.65 cm^3, a wet mass of 35.95 gm, a dry mass of 25.11 gm. For this soil, determine: **(3 Marks)**

- **a)** The shrinkage limit
- **b)** The shrinkage ratio
- **c)** The specific gravity

Q4- The natural moisture content of a soil is 18% and the moist unit weight is 105 pcf and the specific gravity of soil solids is 2.75. This soil is to be excavated and transported to a construction site for use in a compacted fill. If the specifications call for the soil to be compacted to a minimum dry unit weight of 103.5 pcf at the same natural moisture content, how many cubic yards of soil from the excavation site are needed to produce a volume of 11320 yd^3 of compacted fill? **(4 Marks)**

Good Luck


ASTM SIEVE SIZES
200 140 100 70 50 40 30 20 16 12 8 6 4 " 3/8" " " 1" 1 " 2"
B.S. SIEVE SIZES
300 200 150 100 72 52 36 25 18 14 10 7 1/8" 3/16" " 3/8" " " 1" 1 " 2"
Percent Finer
100
90
80
70
60
50
40
30
20
10
0
0.001 0.002 0.006 0.01 0.02 0.06 0.1 0.2 0.6 1 2 6 10 20 60
Equivalent Particle Size (mm)
Clay
Fine
Medium
Coarse
Silt
Fine
Medium
Coarse
Sand
Fine
Medium
Coarse
Gravel
Stone or Boulder

Good Luck