SNS COLLEGE OF TECHNOLOGY

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COIMBATORE

DEPARTMENT OF CIVIL ENGINEERING

19CEB301 – SOIL MECHANICS
III YEAR / V SEMESTER

Unit 1 : INTRODUCTION TO SOIL MECHANICS

Topic 2 : Properties of Soil

Properties of Soil

Index Properties

a) Specific gravity

b) Particle Size Analysis

i) Sieve Analysis (Dry Method)

ii)Hydrometer (Wet Method)

c) Atterberg's Limits

i) Liquid Limit

ii) Plastic Limit

iii) Shrinkage Limit

d) Free swell index

Engineering Properties

a) Permeability

b) Shear strength

c) Consolidation

Engineering Properties:

i) Permeability

a) Constant Head Method (Coarse Grained Soil)

b) Variable Head Method (Fine Grained Soil)

ii) Shear strength

a) Direct shear test (Coarse Soil)

b) Unconfined Compression Strength (Stiff clay)

c) Vane shear test (Very Soft & Soft clay)

d) Tri-axial test (Coarse & Fine Soil)

iii) Consolidation (Settlement)

a) One Dimensional Consolidation test

i)Root-t Method

ii) log-t Method

Specific Gravity of Soil:

Pycnometer

Drying Oven

PARTICLE SIZE ANALYSIS

Analysis(Dry Method) Hydrometer Analysis (Method)

Soils

4.75mm

2.36mm

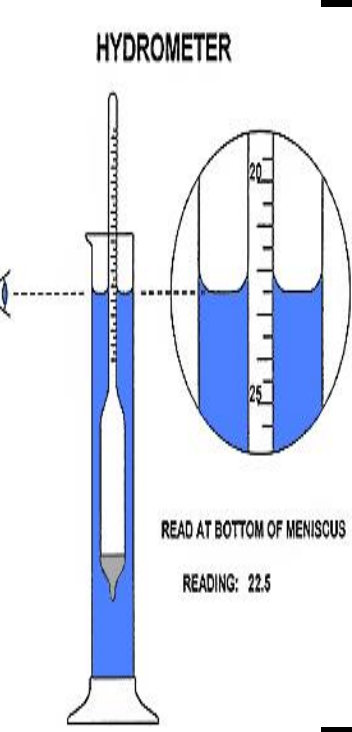
1.18mm

425µ (0.425mm)

212µ (0.212mm)

nm)

m)

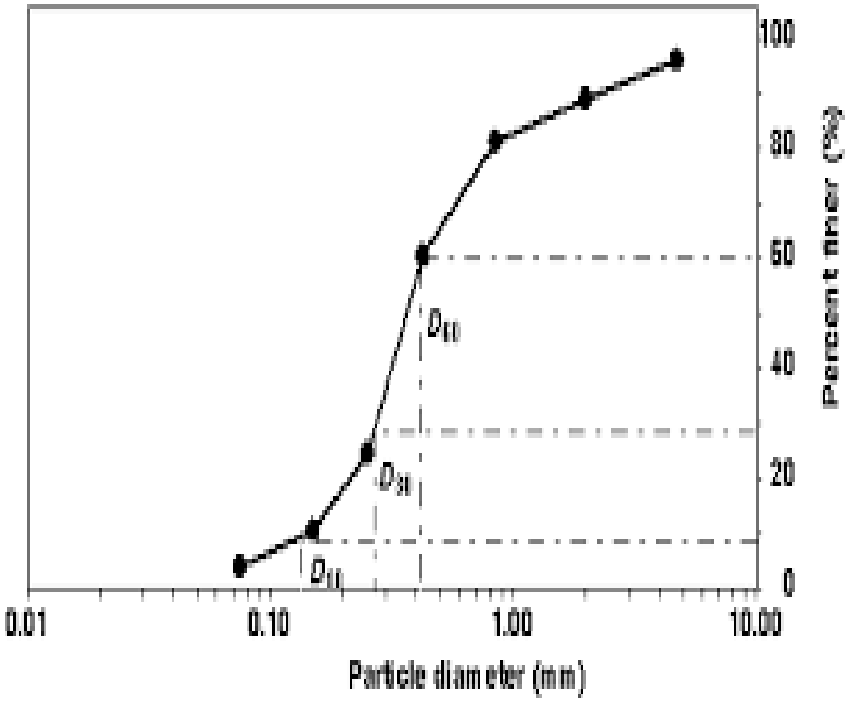


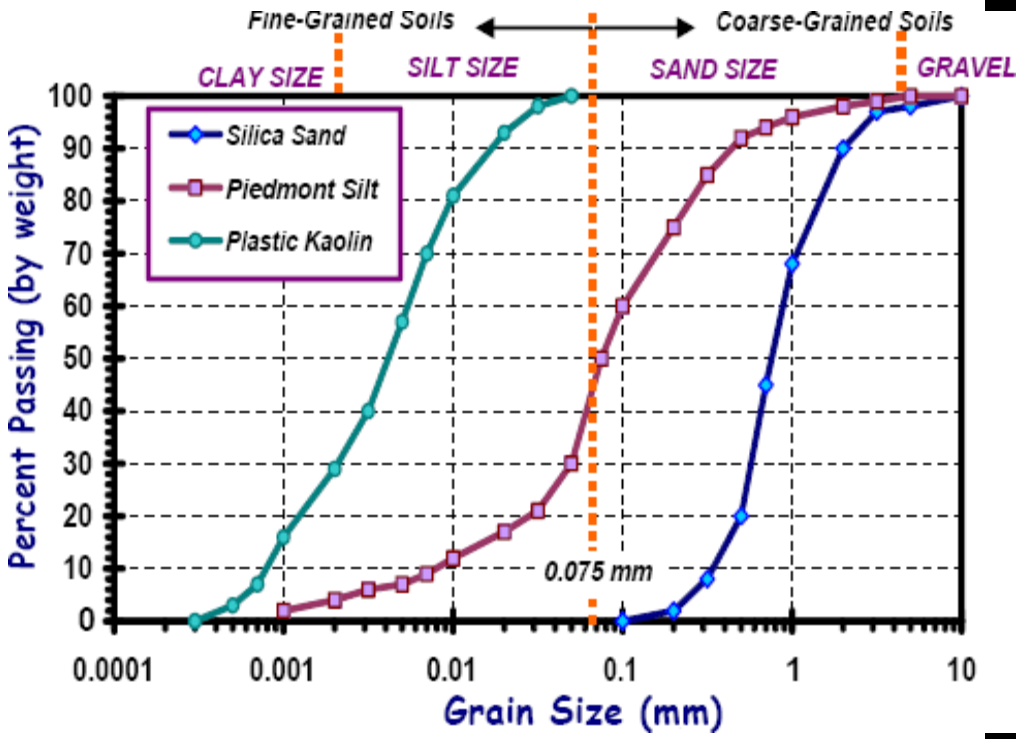
Particle Size Distribution Curve:

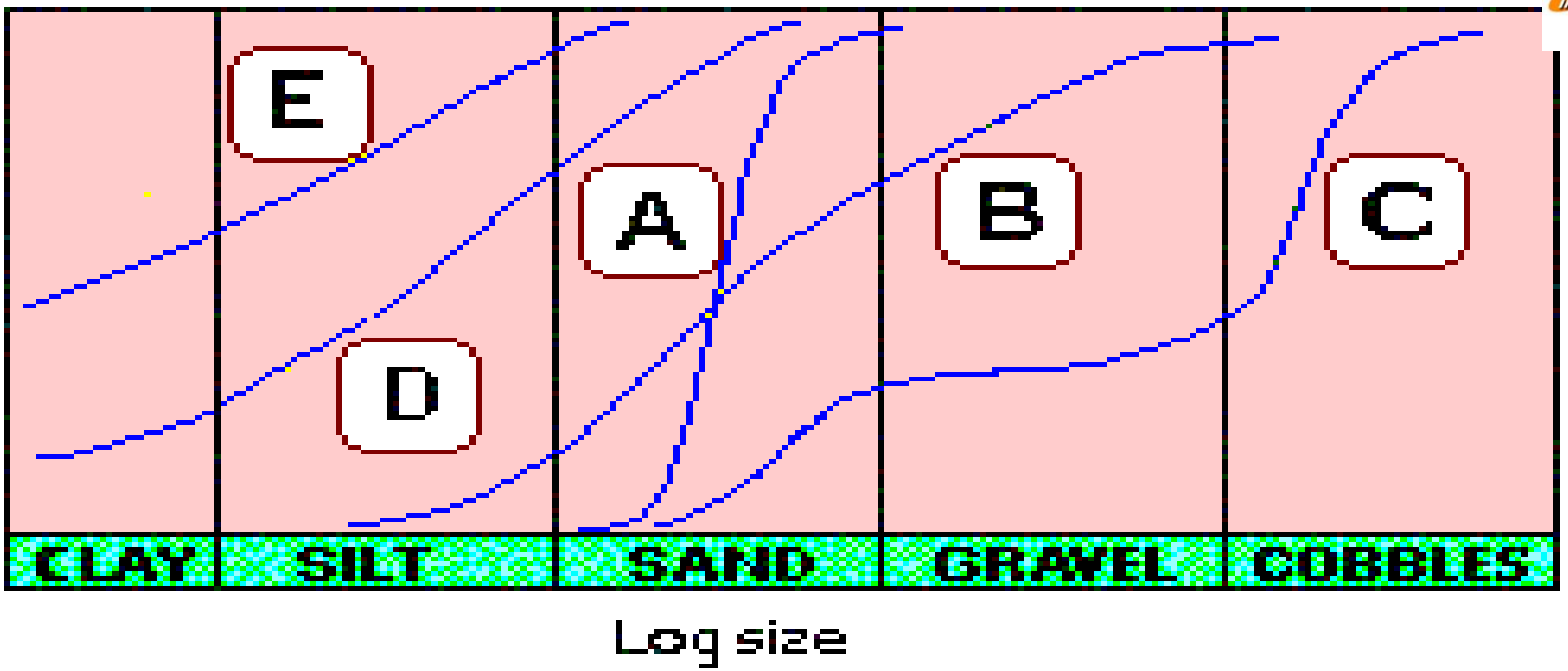
Effective Size (C10) - Used to measure hydraulic conductivity & drainage through soil.

b) Uniformity Co-efficient (Cu) = D_{60} / D_{10}

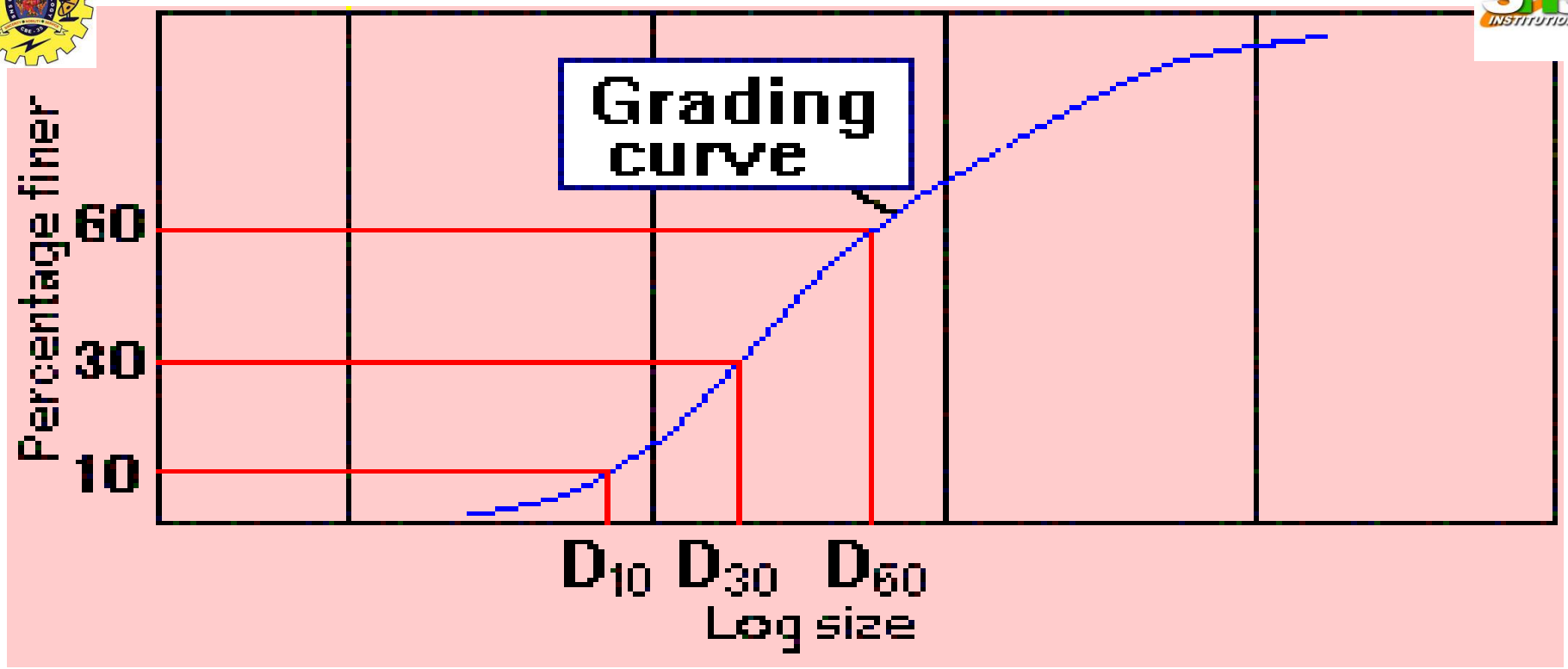
c) Co-efficient of Gradation (Cc) = $D^2_{30}/(D_{60}$ X $D_{10})$







Curve A - a poorly-graded medium SAND
Curve B - a well-graded GRAVEL-SAND (i.e. having equal amounts of gravel and sand)
Curve C - a gap-graded COBBLES-SAND
Curve D - a sandy SILT
Curve E - a silty CLAY (i.e. having little amount of sand)



Obtain the grading characteristics, three points are located first on the grading curve.

D_{60} = size at 60% finer by weight
D_{30} = size at 30% finer by weight
D_{10} = size at 10% finer by weight

Atterberg's Limits (Consistency Limits):

Liquid Limit

Plastic Limit

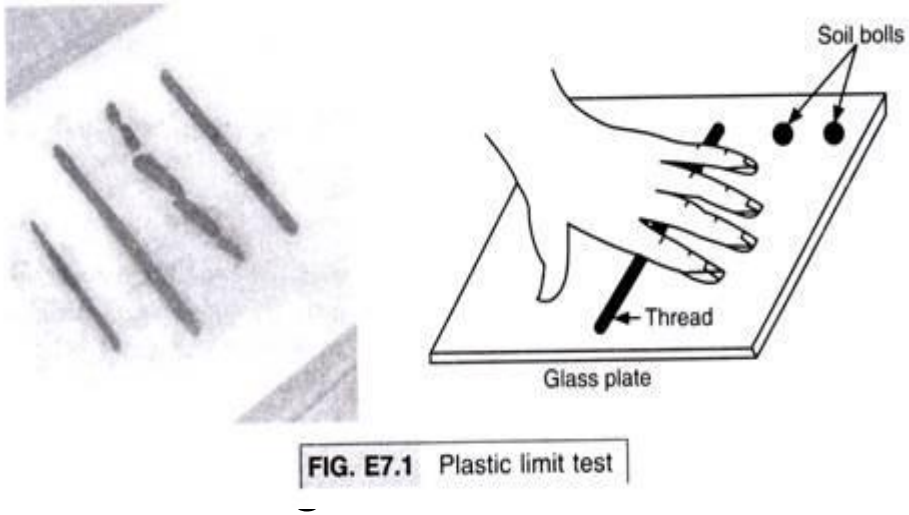


FIG. E7.1 Plastic limit test