



IQRA NATIONAL UNIVERSITY

Assignment

Geotechnical & Foundation Engineering (Lab)

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Section: A

Program: BE Civil Engineering

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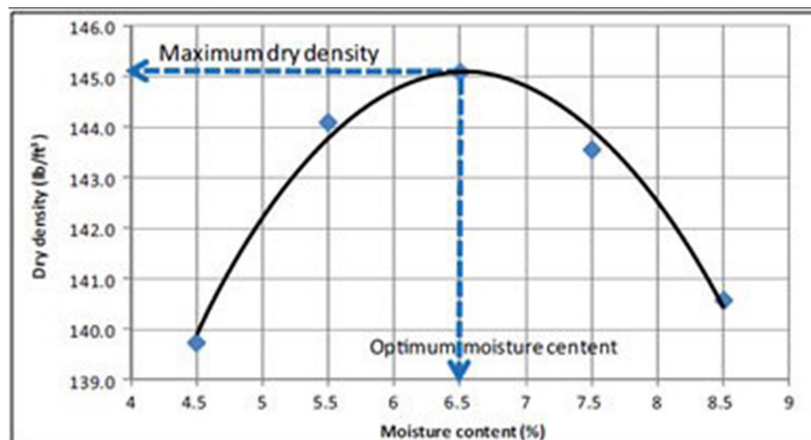
DEPARTMENT OF CIVIL ENGINEERING

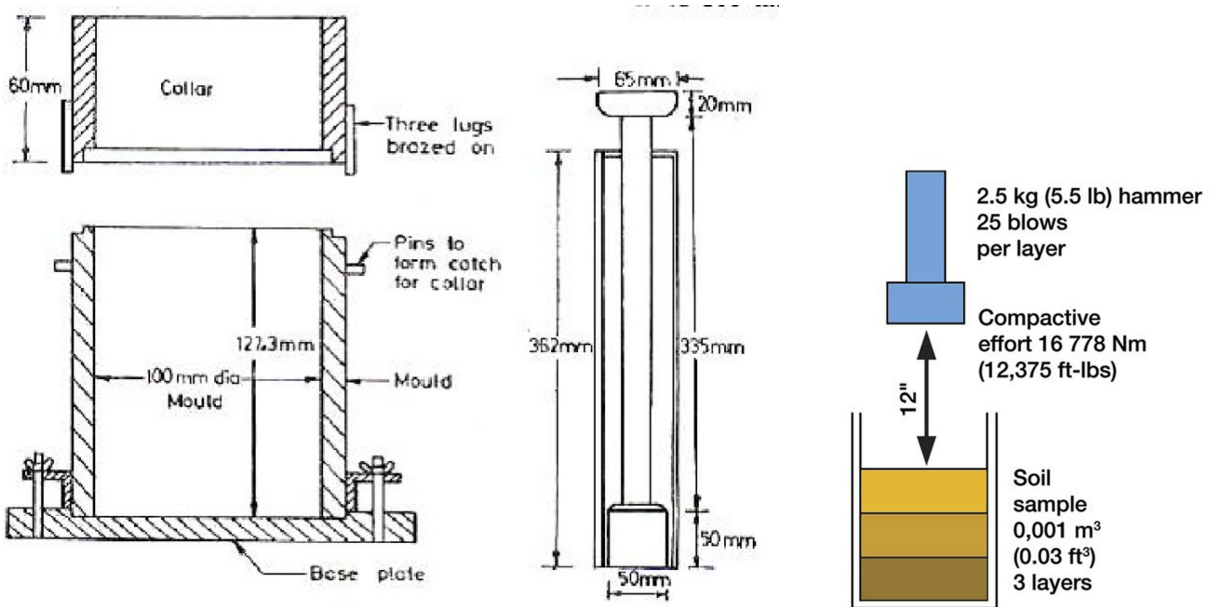
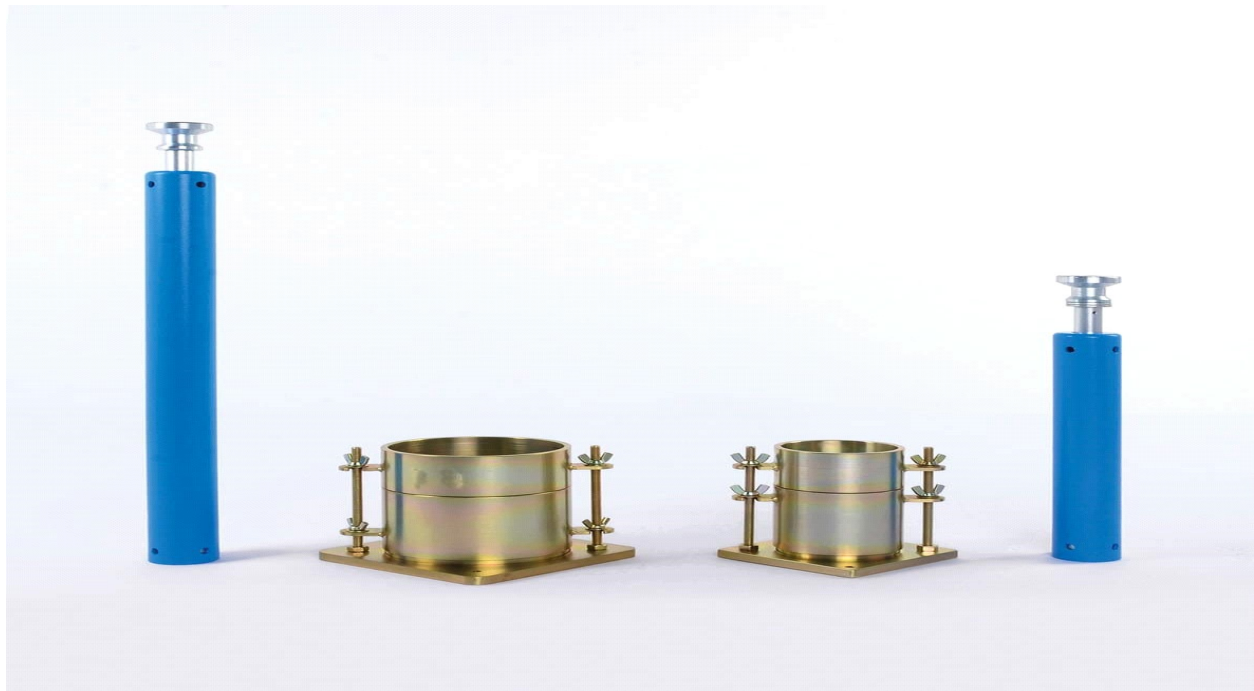
Question: 01

What is the difference between Standard Proctor Test and Standard Penetration Test?

Standard Proctor Test:

- Standard Proctor Test is used to determine the compaction of different types of soil and the properties of soil with a change in moisture content.
- Compaction is the process of densification of soil by reducing air voids.
- Compaction of soil is the optimal moisture content at which a given soil type becomes most dense and achieve its maximum dry density by removal of air voids.
- Compaction should not be confused with consolidation
- A curve is drawn between the water content and the dry density to obtain the maximum dry density and the optimum water content.





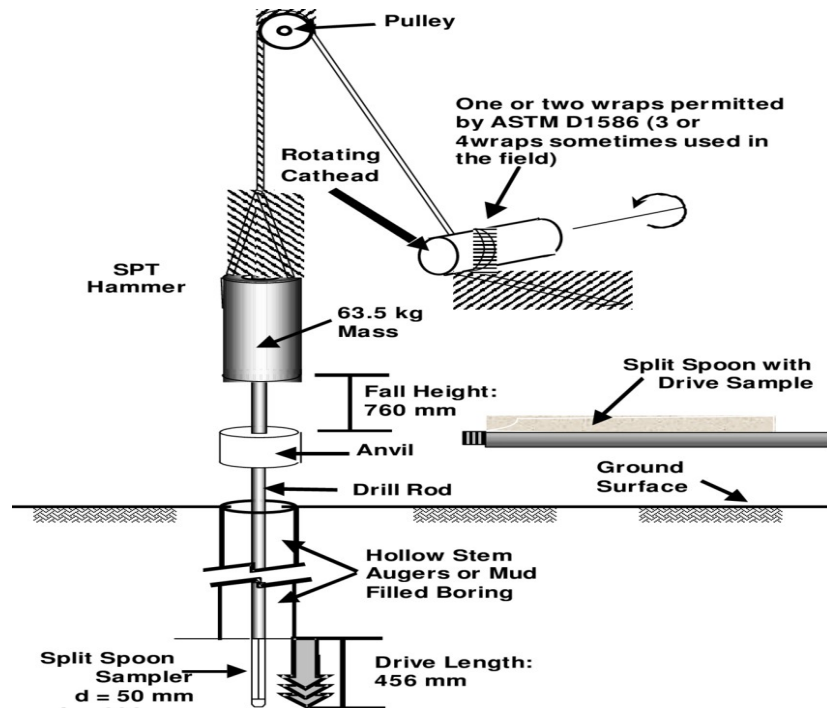
Apparatus of Standard Proctor Test

Apparatus Specifications:

1. Compaction mold, capacity 1000ml.
2. Rammer, mass 2.5 kg
3. Detachable base plate
4. Collar, 60mm high
5. IS sieve, 4.75 mm
6. Oven
7. Desiccator
8. Weighing balance, accuracy 1g
9. Large mixing pan
10. Straight edge
11. Spatula
12. Graduated jar
13. Mixing tools, spoons, trowels, etc.

Standard Penetration Test (SPT):

- The standard penetration test is an in-situ test that is coming under the category of penetrometer tests
- .The standard penetration tests are carried out in borehole.
- The test will measure the resistance of the soil strata to the penetration undergone.
- A penetration empirical correlation is derived between the soil properties and the penetration resistance.
- The test is extremely useful for determining the relative density and the angle of shearing resistance of cohesionless soils.
- It can also be used to determine the unconfined compressive strength of cohesive soils.



SPT picture with tools name mentioned

Apparatus Required for SPT:

1. Standard Split Spoon Sampler
2. Drop Hammer weighing 63.5kg
3. Guiding rod
4. Drilling Rig.
5. Driving head (anvil).

Question: 02

What is the Classification of Soil based on Free Swell Index?

On the basis of Swell Index, Soil are classified as,

<i>Free Swell Index</i>	<i>Degree of Expensiveness</i>	<i>Liquid Limit</i>	<i>Plastic Limit</i>	<i>Shrinkage Limit</i>	<i>Degree of Severity</i>
<20	Low	0.50	0-35%	<17%	Non-Critical
20-35	Moderate	40-60%	25-50%	8-18%	Marginal
35-50	High	50-75%	35-65%	6-12%	Critical
>50	Very High	>60%	>45%	<10%	Severe

Question: 03

Why is Permeability Test of Soil important?

Importance of Soil Permeability Test:

Soil permeability test is a laboratory experiment conducted to determine the permeability of soil

Following Applications illustrates the importance of soil

Permeability in geotechnical design:

- Permeability influences the rate of settlement of a saturated soil under load.
- The design of earth dams is very much based upon the permeability of the soils used.
- The stability of slopes and retaining structures can be greatly affected by the permeability of the soils involved
- Filters made of soils are designed based upon their permeability

Permeability variation according to soil texture

Usually, the finer the soil texture, the slower the permeability, as shown below:

Soil	Texture	Permeability
Clayey soils	Fine	From very slow to very rapid
Loamy soils	Moderately fine	
	Moderately coarse	
Sandy soils	Coarse	