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Question no: 01):-

Part (a): What is the difference between standard Proctor test and standard penetration Test?

Standard Proctor Test: This test is done to find the optimum water content and max dry density of a soil in laboratory.

Standard Penetration Test: The standard penetration test is a common in situ testing method used to determine the geotechnical engineering properties of subsurface soils. It is simple and inexpensive test to estimate the relative density of soils and approximate shear strength parameters.

Standard Proctor Test

- ① 25 no of blows of rammer are given.
- ② Rammer have weight of 2.5kg and height of fall is 12 inches, with a flat circular face of 2" diameter.
- ③ The penetration is done in 3 equal layers.
- ④ It is laboratory method of testing to determine the optimum moisture content and maximum dry density.
- ⑤ Its graph is parabolic in shape.

Standard Penetration Test

- ① 40-60 no of blows per minute are given by the means of hammer.
- ② Hammer have weight of 63.5kg and height of fall is 0.76m.
- ③ The penetration is done in 3 layers of 0.15m increments.
- ④ It is in-situ method to determine different geotechnical properties of soil.
- ⑤ Its simple method and carried out in bore hole and it can be used to determine the unconfined compressive strength of cohesive soil.

Part (b):

What is the classification of soil based on free swell index?

Free Swell Index is the increase of volume of soil without any application of external force or water pressure.

For highways free swell index should always be less than 50%.

Classification:

<u>Free Swell Index</u>	<u>Degree of Expansion</u>	<u>Shrinkage Limit</u>	<u>Plastic Limit</u>
<20	Low	>17%	0-50%
20-35	Moderate	8-18%	40-60%
35-50	High	6-12%	50-75%
50>	Very High	<10%	>60%

Part (c):

Why is permeability test for soil important?

Ans: Soil permeability is the property of soil to transmit water and air and is one of the most important qualities to consider for fish culture.

Importance: The following applications illustrate the importance of permeability in geotechnical design.

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