

Faculty of Engineering and Technology

Civil and Environmental Engineering Department

Final Soil Mechanics Lab (ENCE311)

Abdulhamid Mimi

SaheemMurshidJanuary17, 2021

Student name & No:

**Question 1: (10 Points)**

Fill in the blank spaces in each of the following sentences with the correct answer:

1. Atterberg limits are………….,………………….,……………………..,……………..
2. Dispersing agent used in hydrometer analysis test is prepared of 4% of ………….….. solution
3. Plastic limit can be defined a………………………………………………………….
4. The purpose beyond performing rifling method in sieve analysis test ……………………………………………………………………………………
5. In the modified proctor experiment, each sample was filled on …………layers, each layer was compacted …………blows
6. The degree of compaction (R) can be calculated as……………………………………
7. Permeability can be defined as ……………………………………………………………………………………………………………………………………………………………………………………
8. In the free swell index determination, the soil sample used must pass through sieve………………..

**Question 2: Answer the following questions (10Points)**

1. Modified proctor test is used instead of standard proctor test., explain why? (2 Points)
2. How to make sure that the brass cup in Casagrande liquid limit device falls from 10 mm height? (2 points)
3. In the direct shear experiment, the equipment used can be strain controlled or stress controlled, which type was used and explain why ?*(2Points)*
4. In hydrometer analysis, the temperature correction could be (+) or (-) while zero correction always (+) explain why? *(2Points)*
5. What is the objective of the sieve and hydrometer analysis experiments?*(2Points)*

**Question 3(10points):**

Using the following figure, Answer the following questions:

Determine the shear strength parameters.(3 points)

Based on results gained from part 1, estimate the type of the soil.(2 points)

If the test soil is subjected to a failure shear stress of 180KPa, find the corresponding failure normal stress. (3 points)

If this soil was subjected to a normal stress of 150 KPa and a shear stress of 230 KPa, will this soil exhibit a shear failure, justify your answer. (2 points)

**Question4 (10points):**

**Find the following:**

**(Liquid limit test data)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test number | Weight of empty container (gm) | Weight of moist soil + can (gm) | Weight of dry soil + can (gm) | Blow count |
| 1 | 15.26 | 29.3 | 25.84 | 35 |
| 2 | 17.01 | 31.58 | 27.72 | 23 |
| 3 | 15.17 | 31.45 | 26.96 | 17 |

1- Calculate flow index

2– If it’s given that the plasticity index= 20, then find the plastic limit