Tertiary and Vocational Education Commission

NVQ Level 05 – Semester II

Construction Technology

F45C001M07

Three Hours

Answer any five (05) questions

Question-01

Soil Mechanics

- 1. Define the followings terms with the help of phase diagram of soil.
 - Void ratio a.
 - b. Dry density
 - c. Water content
- 2.
- a. Calculate the "void ratio" and "degree of saturation" of a given soil sample with data given below;
 - Bulk density of 0.55Mg/m³ •
 - Water content 9.89%
 - Specific gravity 1.68 (08 marks) ٠
- b. When the soil sample at full saturated stage, what could be the "bulk density" and "water content"?

(06 marks)

Question-02

- 1. Briefly explain the "consistency stages" of a fine grained soil using a detailed diagram (08 marks) indicating liquid limit, plastic limit and the plastic index.
- 2. The following observations were received in liquid limit test carryout in "Casagrande apparatus". Find out the liquid limit of the soil sample according to the data given below.

(12 marks)

No. of taps	40	30	20	15	10
Wet weight(g)	30.67	32.20	31.30	32.75	30.05
Dry weight(g)	22.00	23.00	22.35	23.26	21.44

(06 marks)

Question-03

- 1. Differentiate the following terms using in soil mechanics,
 - a) Compaction
 - b) Consolidation
- 2. Following results were obtained and tabulated by standard compaction test on a soil sample.

Find and estimate the optimum moisture content, maximum dry density, unit weight and draw the line of zero air avoid relating dry unit weight Vs moisture content. Assume the specific gravity as 2.75. (14 marks)

Moisture content (%)	Bulk unit weight (N/m ³)	
6.2	16.9	
8.1	18.7	
9.8	19.5	
11.5	20.5	
12.3	20.4	
13.2	20.1	

Table Q3-01

Question-04

- 1. Briefly explain the following terms,
 - a. Pore water pressure
 - b. Effective stress
 - c. Total vertical stress

(06 marks)

2. There is a soil deposit shown below, draw the total stress, pore water pressure and effective stress diagrams. Consider the water table as at ground level and saturated unit weights of layer 1 and 2 are 19.2 KN/m³ and 21 KN/m³ respectively.



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(06 marks)

Question-05

A falling head permeability test was performed on a sample of clean uniform sand. The initial hydraulic head was 900mm, the final head was 400mm and 60 seconds was required for the water level in the standpipe to fall. The cross-sectional area of the standpipe was 100mm². The sample was of 40mm diameter and had a length of 180mm. Determine the coefficient of permeability in Darcy's Law. (20 marks)

Question-06

Write short notes on the followings,

- a. Permeability of soil
- b. Classification of soil
- c. Type of soil
- d. Sieve analyses

(4x5=20 marks)