



ELIZADE UNIVERSITY
Pragmatic Innovation for Development

FACULTY: ENGINEERING
DEPARTMENT: CIVIL ENGINEERING
FIRST SEMESTER EXAMINATION (MARCH 2017)
2016/2017 ACADEMIC SESSION

Course Title: Highway Engineering

Course Code: CVE 411

HOD'S SIGNATURE

Instructions:

- 1) **Attempt any four Questions**
- 2) **Time Allowed: 3 hours**
- 3) **SEVERE PENALTIES APPLY FOR MISCONDUCT,
CHEATING, POSSESSION OF UNAUTHORIZED
MATERIALS DURING EXAM**



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ELIZADE UNIVERSITY, ILARA – MOKIN
FACULTY OF ENGINEERING
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Session: 2016/17

Semester: First

Course: Highway Engineering

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Units: 3

Instruction: Attempt four Questions.

Time Allowed: 3 hrs

Question 1

- a. Define soil from the civil engineering point of view. **2 Marks**
- b. Highway engineers are interested in the basic engineering properties of soils because soils are used extensively in highway construction. Adduce reasons why soil properties are of significant importance. **4.5 Marks**
- c. State the characteristics and engineering properties of soils that are important to highway engineers. **4.5 Marks**
- d. Briefly explain what you understand by Weathering. **4 Marks**

Question 2

- a. Define the following: i. Compaction **2 Marks** ii. Soil Stabilization **2 Marks**
- b. Explain two major importance of soil stabilization **2 Marks**
- c. Discuss the most used stabilization types, the reasons for using it and the factors affecting its application **9 Marks**

Question 3

- a. Define Soil Classification. **2 Marks**
- b. The following data were obtained for a soil sample.

Plasticity Tests	Sieve No.	Percent Fine
4		
10	97	LL= 48%
40	93	PL= 26%
100	88	
200	78	
	70	

Using the AASHTO method for classifying soils, determine the classification of the soil and state whether this material is suitable in its natural state for use as a subbase material. Given that:

$$GI = (F - 35)\{0.2 + 0.005(LL - 40)\} + 0.01(F - 15)(PI - 10)$$

13 Marks

Question 4

a. With a Schematic diagram of a rural highway network serving towns, villages, and cities, briefly explain the following:

8 Marks

- i. A rural principal highway system
- ii. A freeway
- iii. Rural minor arterial systems
- b. Define Right-of-way.
- c. Enumerate factors affecting highway geometric design

2 Marks

5 Marks

Question 5

a. Define the following: i. Horizontal alignment

2 Marks

ii. Vertical alignment.

2 Marks

b. The figure below (Figure Q 5) illustrates the forces acting on a vehicle of weight W as it is driven round a highway bend of radius R . Where M is the mass of the vehicle, the angle of incline of the road (superelevation) is termed α , side frictional force between the vehicle and the highway is P , and the reaction to the weight of the vehicle normal to the surface of the highway is N .