FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF PHYSICAL SCIENCES
DEPARTMENT OF GEOLOGY

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BTech GEOLOGY
2017/2018 SESSION

COURSE CODE: GEL 413 **UNIT:** 3

COURSE TITLE: ENGINEERING GEOLOGY

INSTRUCTIONS: ANSWER ANY TWO QUESTIONS FROM EACH SECTION

TIME ALLOWED: 2 HOURS **DATE:** 27 APRIL 2018

SECTION A

1a. Define the following terms: (i) specific gravity (ii) moisture content (iii) compaction (iv) porosity (v) permeability.

1b. Outline in detail the procedures for the determination of specific gravity in the laboratory.

1c. Comment on the factors that could make the specific gravity of sand to fall out of the range.

2a. Define the following terms: (i) consistency index, (ii) liquid index, (iii) plastic limit, (iv) plasticity index, (v) activity.

2b. The result of an Atterberg limit test shows that LL = 60, PL = 45. If the natural moisture content is 35%; calculate Atterberg indices.

2c. Comment on your results.

3. The result obtained from a sieve analysis test is shown in Table 1 below:

Sieve diameter (mm)	2.000	0.800	0.4000	0.2000	0.175	0.150	pan
Weight of sample retained (g)	72.08	55.63	41.72	30.72	22.82	15.86	16.12

a. Calculate the percentage passing
b. Plot the graph of percentage passing against sieve sizes in millimeters
c. Determine the coefficient of curvature, coefficient of uniformity and permeability from the graph assuming C = 1.5.
d. Comment on your results.

SECTION B

1 **a.** Discuss rock material properties in relation to engineering properties of rocks
b. Discuss rock mass properties in relation to engineering properties of rocks
c. Briefly comment on any three of the following
i. Rock strength and the engineering significance of rock type
ii. Rock color and the engineering significance of rock color
iii. Rock type and the engineering significance of rock type
iv. Rock particle size and the engineering significance of rock type

2. **a.** Enumerate all the methods used in excavation of soil.
b. Describe any three of the methods enumerated above
c. Discuss how you will control groundwater during excavation

3. **a.** Write concise notes on any three of the following
b. Seismic disturbance as a factor controlling stability of slopes
c. Sources of settlement
d. Groundwater as a geologic factor in slope stability
e. Criteria for determination of Bearing Capacity of soils.