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 518 **UNIT:** 2

COURSE TITLE: SUBSURFACE GEOLOGICAL METHODS

INSTRUCTIONS: ANSWER THREE QUESTIONS IN ALL. AT LEAST ONE QUESTION MUST BE ANSWERED FROM EACH SECTION

TIME ALLOWED: 2 HOURS **DATE:**

SECTION A

1. (a) (i) Define subsurface geology
(ii) List any three of its applications

(b) Explain the following concepts
(i) Well logging
(ii) Formation evaluation

(c) Name (i) two lithology logs (ii) two porosity logs

2. (a) Explain the concept of sedimentary facies

(b) Answer the following questions using Figure 1, provided
(i) Do a lithologic interpretation of the interval between 4700 ft and 48500 ft
(ii) Using depth, state the positions of any two sharp contacts

(iii) Identify any two intervals with upward coarsening facies

(c) List any three sources of subsurface geological data

3. Answer this question using Figure 2 provided
(a) Identify the following portions of the hydrocarbon reservoir sand:
(i) Gas interval
(ii) Oil interval
(iii) Oil-water contact

(b) (i) Estimate the resistivity values of the sand where it is 100 % filled with water (R_0)
(ii) Estimate the resistivity values of the sand where it is hydrocarbon bearing (R_t)
(iii) Estimate the water saturation of the sand using Sw = Root of R_0/R_t
(iv) Determine hydrocarbon saturation (Sh) using Sh = 1-Sw

SECTION B

4. With well labelled illustrative diagrams, describe how bottom hole conventional cores are obtained from the subsurface
b) Briefly explain geological information obtainable from core

5.Using illustrative diagrams, explain the geometric relationships commonly displayed by seismic reflectionsconsidering both the substratum and the upper sequences