

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

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BTech GEOLOGY,**  
**2015/2016 SESSION**

**COURSE:** GEL 518 (SUBSURFACE GEOLOGICAL METHODS)

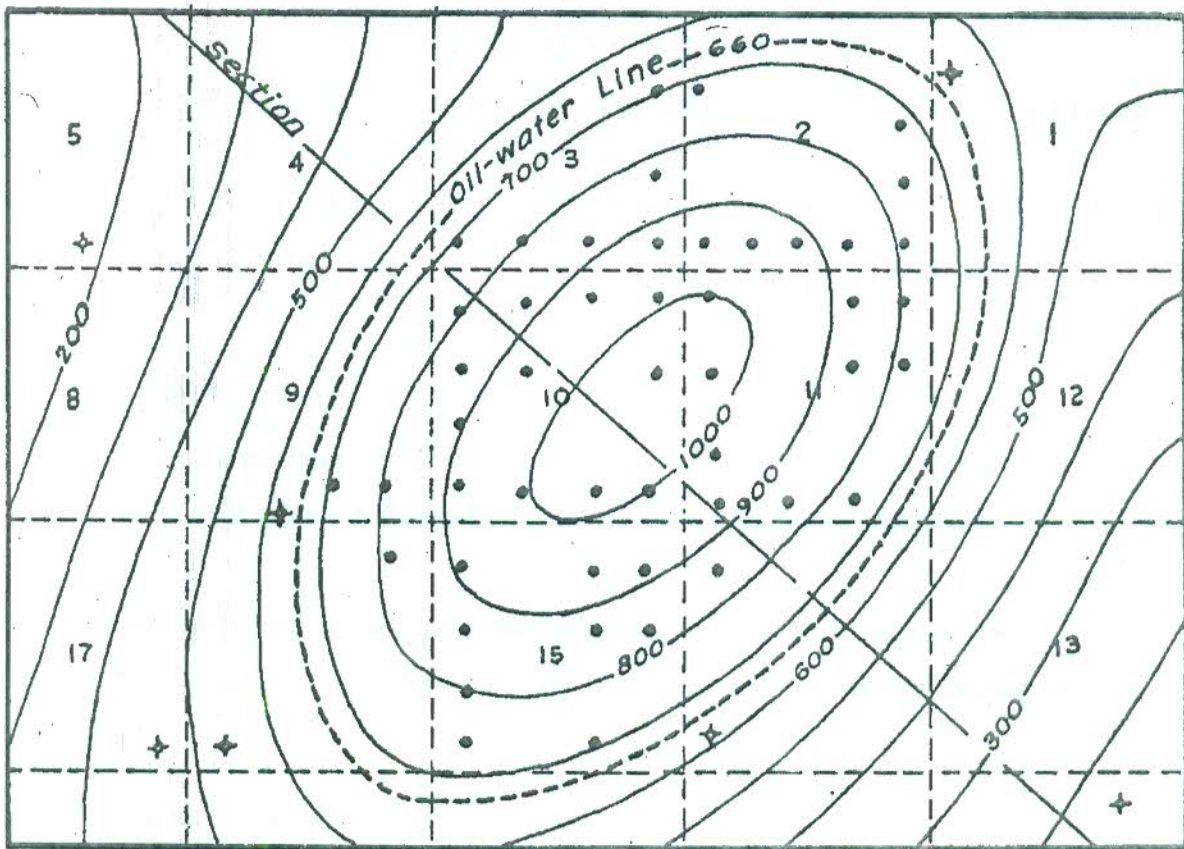
**UNITS:** 2

**DATE:** 14<sup>th</sup> April, 2016.

**TIME ALLOWED:** 2Hours

**INSTRUCTION:** Answer any three (3) Questions.

1. Figure 1 shows a structure contoured on top of a producing formation. The oil-water contact is established at 660m which is shown by dash line. Study the figure and answer the following questions.
  - i. Draw the structural map and the corresponding isopach of the producing interval.
  - ii. What is the thickest part of the zone on top of the structure and its corresponding isochore interval?
2. a. What is an Isopach map?
  - b. Distinguish between structural contour maps and cross-section.
  - c. What are the uses of Isopach and Isochore maps?
3. Using well labelled diagram, briefly explain the various expressions of unconformities on seismic section.
4. Give a detailed discussion of gamma ray logs, which should include measured parameters, types of gamma ray log, applications and gamma ray motifs.
5. a. Write on the application of density log estimation porosity of sandstone.
  - b. Define i. Hydrocarbon saturation
    - ii. Resistivity index
    - iii. Gamma ray shale index
  - c. i. Discuss Archie's method of estimating water saturation.
    - ii. Discuss the issues with Archie's method of estimating water saturation in shaly sandstone reservoirs, and how this method is modified for Niger-Delta.



• Figure 1