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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCE**

**JULY 2018 EXAMINATIONS**

**COURSE CODE: PHY 461**

**COURSE TITLE: GEOPHYSICS III**

**CREDIT UNIT 3**

**TIME ALLOWED (21/2 HRS)**

**INSTRUCTION: *Answer question one (1) and any other four (4) questions***

**QUESTION 1**

**Q1.** a). Discuss the general principle of EM Surveying. (**5 Marks)**

b). Outline the factors which control the depth of penetration of EM Fields. (**2 Marks)**

c). State the applications of Electrical and Gravity Methods. (**4 Marks)**

d). Differentiate between Vertical Electrical Sounding and Horizontal sounding. (**3 Marks)**

e). State the Biot-Savart law. (**2 Marks)**

f).Write short note on the CSAMT principles. (**6 Marks)**

**QUESTION 2**

2. (a) Compare and contrast TEM with CWEM. (**4 Marks)**

(b) Compare and contrast TEM with IP. (**4 Marks)**

(c) Describe the concept of TEM depth sounding. (**4 Marks)**

**QUESTION 3**

3. (a) Name and describe the various array systems. (**6 Marks)**

(b) Discuss the depth of penetration of resistivity survey equipment. (**4 Marks)**

(c) How would you enhance the signal to noise ration in resistivity survey? (**1 Mark)**

(d) What criteria would you use in the choice of array method? (**1 Mark)**

**QUESTION 4**

4. (a) When would you describe conductors as being well coupled? (**6 Marks)**

(b) How can Nomenclature be a problem in electrical work? (**6 Marks)**

**QUESTION 5**

Q5 ( a).Differentiate between Archie’s law and Ohm’s law. (**4 Marks)**

( b). Give the Resistivity ranges of the following Earth materials. (**4 Marks)**

(i). Topsoil (ii). Loose sand. (iii). Gravel (iv). Clay

(c). How would you enhance the Signal-to-Noise ratio in VLF Data? (**4 Marks)**

**QUESTION 6**

Q6 (a). Define Resistivity and give its SI Unit. (**3 Marks)**

(b). Name the Equipment used in Electrical Resistivity survey. (**4 Marks)**

(c). What criteria would you use in the choice of Array Method? (**5 Marks)**