



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**  
**FACULTY OF SCIENCES**  
**DEPARTMENT OF PHYSICS**  
**2025\_2 EXAMINATIONS**

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**COURSE CODE:** PHY461  
**COURSE TITLE:** GEOPHYSICS  
**CREDIT UNIT:** 3  
**TIME ALLOWED:** (3 HRS)  
**INSTRUCTION:** *Answer question 1 and any other three questions*

**QUESTION 1**

- (a) Explain the term Apparent Resistivity (4marks)
- (b) Calculate the current density, resistance and electrical field of a 5m length of copper wire with a cross sectional area of  $3.31 \text{ mm}^2$  carrying a current of 10 mA. Given resistivity of copper  $\rho = 1.68 \times 10^{-8} \Omega\text{m}$ . (8marks)
- (c) Differentiate between active and passive methods of geophysical survey (8marks)
- (d) Discuss the principle of gravity methods in geophysics (5marks)

**QUESTION 2**

- (a) Discuss five (5) factors in which the conductivity of the rocks depend on. (7.5marks)
- (b) List five (5) applications of electromagnetic methods (7.5 marks)

**QUESTION 3**

- (a) Explain the term DC electrical resistivity (4marks)
- (b) Differentiate between resistivity and conductivity (8 marks)
- (c) List four (4) factors affecting electrical resistivity of rock (8marks)

**QUESTION 4**

- (a) What are active geophysical method in geophysics and its example (8marks)
- (b) Give three (3) reason of estimating water saturation (6marks)
- (c) List the two (3) applications of magnetic method of geophysical survey (6marks)

**QUESTION 5**

- (a) Discuss the principle of magnetic method of geophysics (6marks)
- (b) List four (4) factors which affect resistance to electrical flow (8marks)
- (c) Mention two (2) method of electrical resistivity (6marks)

**QUESTION 6**

- (a) Explain the DC method in geophysics (4marks)
- (b) Discuss the two (2) electrode configuration/arrays (8marks)
- (c) Discuss how resistivity vary with depth (8marks)