****

**NATIONAL OPEN UNIVERSITY OF NIGERIA**

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

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCE**

**2018\_2 SEMESTER EXAMINATION**

**COURSE CODE: PHY 407**

**COURSE TITLE: SOLID STATE PHYSICS II**

**CREDIT UNIT 3**

**TIME ALLOWED (2½ HRS)**

**INSTRUCTION: *Answer question 1 and any other four questions***

**QUESTION 1**

a. What is solid state Physics? (3 Marks)

b. Divide it into two distinct groups (4 Marks)

c. Differentiate between diamagnetism and paramagnetism (5 Marks)

d. Explain the following terms as related to grain boundaries

i. Twin boundaries (2½ Marks)

ii. Stacking faults (2½ Marks)

iii. Boundaries (2½ Marks)

iv. Ferromagnetic domain walls (2½ Marks)

**QUESTION 2**

a. Explain what you understand by the word dielectric (3 Marks)

b. State any three properties of dielectric material (3 Marks)

c. Mention four properties of local electric field. (6 Marks)

**QUESTION 3**

a. Define the following: (i) electric susceptibility (3 Marks)

(ii) polarisability (3 Marks)

b. Explain dipole relaxation (6 Marks)

**QUESTION 4**

a. Explain why the magnetic susceptibility of diamagnetic materials will always be less than zero. (4 Marks)

b.Explain magnetisation of materials (4 Marks)

c. List four paramagnetic materials. (4 Marks)

**QUESTION 5**

a.Enumerate information obtained about solids through resonance(4 marks)

b.Write four unusual characteristics of ferromagnetic resonance(4 marks)

c.List some materials with positive susceptibility(4 marks)

**QUESTION 6**

a.StateCurie-Weiss law(2 marks)

b.Describe the two basic types of dislocations(6 marks)

c.The plates of a parallel plate capacitor are 2mm apart and 5m2 in area. The

plates are in a vacuum. A potential difference of 2000 volts is applied across the

capacitor. Calculate the magnitude of the electric field between the plates. (4marks)