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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**

**2019\_1 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**

1. State 3 properties of a dielectric. **3 marks**
2. Differentiate between Magnetization of a material M and magnetic
3. susceptibility **2 marks**
4. List 4 universal characteristics of ferromagnetic resonance. **4marks**
5. State 3 ways to identify a diamagnet. **3 marks**
6. Briefly explain the term Block wall. **3 marks.**
7. What is an electric dipole? **2 marks**
8. A 2.0 µf capacitor is charged by a 12 volts battery. Calculate the energy stored. **3 marks**
9. State the mathematical expression of Curie Weiss law and what its significance is.  **2marks**

**QUESTION 2**

a. Show that the induced electric field ( ) when and dielectric is inserted between the

plates of a parallel plate capacitor is given by = {1-1/k} where  is the Original Electric

field and K is the dielectric constant **2 marks**

b List four items to be noted in an electric field **4 marks**

Ci What is Polarisabilty? **1 mark**

Cii What is Clausius – Mossotti equation ? **2 marks**

d List the three parts of Total Polarisibility of an atom and their origin **3 marks**

**QUESTION 3**

a) What is dipole Relaxation time? **3 marks**

**b** Explain the term Magnetisation **4 marks**

c Discuss the concept of Paramagnetism **5 marks**

**QUESTION 4**

a) What are crystals defects? **2 marks**

b) What is a point defect? **2 marks**

c) State 4 different types of point defect **8 marks**

**QUESTION 5**

a) State 4 differences between point and line defect **6 marks**

b)Explain Grain Boundaries **6 marks**

**QUESTION 6**

a Differentiate between the low angle and high angle boundaries **3 marks**

b State six factors that determine the size and shape of grains during solidification **9 marks**