

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

FIVE-SEMESTER BACHELOR OF EDUCATION (SANDWICH) PROGRAMME
SECOND YEAR, THIRD SEMESTER QUIZ 1, AUGUST 2019

AUGUST 25, 2019

SOLID STATE PHYSICS

10:30 AM - 11:30 AM

Attempt all questions.

1. a. What is Lattice?
b. The molecules of a solid are held together in a number of ways. What are the two common ways that solid molecules are held in solids?
2. Describe ways in which energy band containing electrons in a good insulator are filled.
3. How many conduction electrons are in a cube of magnesium with a volume of $2.00 \times 10^{-6} \text{ m}^3$? Magnesium atoms are bivalent (magnesium has density of $1.738 \times 10^3 \text{ kg/m}^3$ and a molar mass M of $24.312 \times 10^{-3} \text{ kg/mol}$. Hint: number of conduction electrons in sample = (number of atoms in sample) (number of valence electrons per atom).

$$n_e = \frac{n}{M}$$

$$\frac{m}{V} =$$

$$1.738 \times 10^3 = \frac{m}{2.00 \times 10^{-6}}$$

$$n = 1.738 \times 10^3 \times 2.00 \times 10^{-6}$$

$$n = \frac{m}{\text{molar mass}}$$