

**THE UNIVERSITY OF ZAMBIA
SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING
UNIVERSITY EXAMINATIONS
MIDI-SEMESTER II TESTS 2004
OCTOBER 2004**

ME 232 – PROPERTIES OF ENGINEERING MATERIALS I

Time Allowed: TWO Hours **CLOSED BOOK**
ANSWER: ALL QUESTIONS **ALL QUESTIONS CARRY EQUAL MARKS**
PLEASE HAND IN QUESTIONS 1 & 2 SEPARATELY FROM QUESTIONS 3 & 4.

Question 1

Question 2

Question 3

- (a) What are the four principal groups of materials available to the engineer and what are their principal properties? [10 marks]
- (b) Explain briefly the major considerations in the selections of materials for a particular application and their ultimate influence on the material selected. [15 marks]

Question 4

- (a) Sketch the unit cells of three types of crystal structure commonly found in metals and give examples of at least two metals crystallising in each of these forms. [06 marks]
- (b) Calculate the number of atoms contained within the unit cells of each of the three types considered. [09 marks]
- (c) The atomic radius for iron is 0.1238 nm and is body-centred cubic in one of its three forms. Calculate its lattice parameter, a , assuming atoms are perfect spheres. [05 marks]

END OF TEST
Dr J Phiri / G M Munakaampe