



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BTAC

ACH 4307 : MATERIAL CHEMISTRY

END OF SEMESTER EXAMINATION

SERIES: MAIN EXAMINATION

TIME: 2 HOURS

DATE: Pick Date Select Month 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Answer question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

- (a) Write brief notes on the classification for solids in terms of:
- Degree of order (4 marks)
 - Typical properties dependent on chemical bonding (3 marks)
 - Structure and Symmetry (2 marks)
- (b) What is:
- A biomaterial (1 mark)
 - Biocompatibility (1 mark)
- (c) What is a laser? (1 Mark)
What is the structure of semiconducting laser? (1 mark)
- (d) How does the Band Theory help us understand what makes conductor, insulator, or semiconductor? (4 marks)
- (e) What is:
- A Superconductor? (2 marks)
 - The Critical Temperature for Superconductors (3 marks)

(f) what kind of information do the following analytical techniques give:

- (i) X-Ray Diffraction
 - (ii) Neutron Diffraction
 - (iii) Solid State NMR
 - (iv) Scanning Electron Microscopy
 - (v) Transmission Electron Microscopy
 - (vi) Elemental dispersion analyser – using X-rays
 - (vii) IR Spectroscopy
 - (viii) X-ray fluorescence spectroscopy
- (1 mark each)

Question TWO

- (a) With the aid of diagrams, describe the seven crystal systems (14 marks)
- (b) What is the difference between hexagonal close packing and cubic close packing? (6 marks)

Question THREE

Give a comparison table of the structures and properties between metals and ceramics. (20 marks)

Question FOUR

Write note on Zeolites with reference to:

- (a) Mineralogy (5 marks)
- (b) Common properties (7 marks)
- (c) Uses (4 marks)
- (d) Zeoponics (4 marks)

Question FIVE

Describe the following physical properties of materials attributable to structure:

- (a) Melting point (7 marks)
- (b) Hardness (8 marks)
- (c) Electrical Conductivity (5 marks)

