MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN MECHANICAL ENGINEERING

MEDPR 219: MATERIAL SCIENCE III

DATE: 8/5/2019 **TIME: 8.30-10.30 AM**

INSTRUCTIONS:

Answer Question One (Compulsory) and Any Other Two Questions

QUESTION ONE (30 MARKS)

a) Differentiate between Macro and Micro examinations (4 marks)

b) Define Polymeric materials (2 marks)

c) i define ceramics (2 marks)

ii State any four properties of ceramics (4 marks)

d) Describe the following classes of plastics;

i. Thermosetting

ii. thermoplastics (4 marks)

e) i state four properties of Polymeric materials (4 marks)

ii state any four applications of Polymeric materials (4 marks)

f) describe briefly the principle of micro-examination using a sketch (6 marks)

QUESTION TWO (20 MARKS)

Describe the following thermal equilibrium diagrams using sketches;

a) simple eutectic type; (6 marks)

b) combination type; (7 marks)

c) solid solution type; (7 marks)

QUESTION THREE (20 MARKS)

Explain the following material testing processes using sketches;

a) Ultra-sonic testing

b) Eddy current

c) Magnetic particles

d) Gamma rays method

QUESTION FOUR (20 MARKS)

a) discuss the following types of ceramic materials;

i. crystalline

ii. non- crystalline (6 marks)

b) Describe any three applications of and three products of ceramic engineering. (6 marks)

c) Using sketches describe the etching process in metallography (8 marks)

QUESTION FIVE (20 MARKS)

Describe the following types of plastics stating properties, use and its application.

a) Urea formaldehyde

b) Melamine formaldehyde

c) Phenolic formaldehyde

d) Polypropylene

e) Polytetrafluoroethylene