

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

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**University Examinations 2016/2017**

FIRST YEAR FIRST SEMESTER EXAMINATION

FOR

DIPLOMA IN ELECTRICAL ENGINEERING

**EMC 2102: MATERIALS AND METALLURGY I**

**DATE: DECEMBER 2016 TIME: 1 ½ HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two***questions.

**QUESTION ONE (30 MARKS)**

1. State the differences between metals and non metals (3 marks)
2. Briefly describe the following types of materials: Metals, Ceramics and polymers (6 marks)
3. Name four types of atomic bonds observed in materials (4 marks)
4. Define heat treatment and state its objectives (4 marks)
5. State three properties of conductors (3 marks)
6. State and explain two mechanical properties of materials (4 marks)
7. Explain corrosion by oxidation and galvanic corrosion (6 marks)

**QUESTION TWO (15 MARKS)**

1. Discuss the qualities of good electrical insulating material (10 marks)
2. Briefly describe any tow heat treatment processes. (5 marks)

**QUESTION THREE (15 MARKS)**

1. Briefly explain the terms: resistivity, conductivity, temperature coefficient of resistance and electric strength. (8 marks)
2. Describe metallic bonds and state five properties of metallic compounds (7 marks)

**QUESTION FOUR (15 MARKS)**

1. Explain briefly the following:
2. Electrons
3. Protons
4. Neutrons (6 marks)
5. What is the difference between crystalline and non crystalline solids? (4 marks)
6. State five methods of preventing corrosion in metals (5 marks)