

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**P.O. Box 972-60200 – Meru-Kenya.**

**Tel: 020-2069349, 061-2309217. 064-30320 Cell phone: +254 712524293, +254 789151411**

**Fax: 064-30321**

**Website:** [**www.must.ac.ke**](http://www.must.ac.ke) **Email:** [**info@must.ac.ke**](mailto:info@must.ac.ke)

**University Examinations 2015/2016**

FIRST YEAR FIRST SEMESTER EXAMINATION FOR DIPLOMA IN ELECTRICAL ENGINEERING

**EMC 2102: MATERIALS AND METALLURGY I**

**DATE: NOVEMBER 2015 TIME: 11/2 HOURS**

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

**QUESTION ONE (30 MARKS)**

1. Name four types of atomic bonds observed in materials and describe them giving examples. (6 Marks)
2. What is the difference between crystalline and non-crystalline solids? (4 Marks)
3. State the differences between metals and non metals. (5 Marks)
4. Define the term latent heat of vaporization and latent heat of fusion. (2 Marks)
5. State five methods by which corrosion can be controlled or prevented. (5 Marks)
6. Using sketches explain three variations in position of atoms within the unit cell in a cubic crystal system. (6 Marks)
7. Name two heat treatment processes. (2 Marks)

**QUESTION TWO (15 MARKS)**

1. Describe any five electrical properties of metals. (10 Marks)
2. Describe metallic bonding and explain how it differs from ionic bonding. (5 Marks)

**QUESTION THREE (15 MARKS)**

1. Briefly describe the factors that should be considered during design and fabrication process to reduce or prevent corrosion in metal structure. (10 Marks)
2. Name any three ceramic materials and describe their applications in electrical engineering. (5 Marks)

**QUESTION FOUR (15 MARKS)**

1. Briefly describe any five types of corrosion. (10 Marks)
2. Compare and contrast metallic, covalent and ionic bonds. (5 Marks)