



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING

MASTER OF ENGINEERING IN MANUFACTURING ENGINEERING AND OPERATIONS MANAGEMENT

ENVIRONMENTALLY CONSCIOUS MANUFACTURING

TIE 6221

First Semester Supplementary Examination Paper

August 2015

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: N/A

Examiner's Name: Eng. Davison. Zimwara

INSTRUCTIONS AND INFORMATION TO CANDIDATES

1. Answer any **Five (5)** questions
2. Each question carries 20 marks
3. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1.	20
2.	20
3.	20
4.	20
5.	20
TOTAL	100

Question 1

- a) What are the key elements of an environmental management system? [5]
- b) Explain the mandate of EMA in Zimbabwe and what challenges they can be facing? [15]

Question 2

Give a detailed account of the following concepts as applied to the Manufacturing Environment.

- a) Eco design, [5]
- b) Eco efficiency, [5]
- c) Green manufacturing, [5]
- d) Chimney design. [5]

Question 3

Explain the concept of design for the Environment. [20]

Question 4

- a) What is cleaner production? [2]
- b) What are the elements of cleaner production? [4]
- c) What are the applications of cleaner production? [5]
- d) Identify and explain the cleaner production practices. [9]

Question 5

Explain the issues that are discussed in agenda 21 [20]

Question 6

- a) Discuss the elements of ISO 14001 Standard. [8]
- b) Explain the following terms in relation to Sustainable development.
 - i. Life cycle analysis, [4]
 - ii. Pollution prevention, [4]
 - iii. Material substitution. [4]

Question 7

- a) Discuss those environmental aspects which are affected by a manufacturing plant.[15]
- b) How are these aspects of the environment affected? [5]