



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING

Bachelor of Engineering Honours Degree Industrial and Manufacturing Engineering

Environmental Conscious Manufacturing

TIE 5214

**Second Semester Main Examination Paper
April/May 2015**

This examination paper consists of 2 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements:

Examiner's Name: Eng. Davison. Zimwara

INSTRUCTIONS AND INFORMATION TO CANDIDATE:

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

Question 1

- a) Assess the ways in which Environmental Conscious Manufacturing can meet the goals of Sustainable Development. [10]
- b) Discuss the controversy surrounding sustainable development [10]

Question 2

Discuss how the following techniques in a manufacturing environment can reduce the impact on the environment

- a) LCA (Life cycle assessment) [10]
- b) Eco-efficiency , [3]
- c) Energy efficiency , [2]
- d) Design for environment , [3]
- e) Chimney design. [2]

Question 3

- a) What is Global Warming and how do Industries contribute to it and how can it be reduced. [10]
- b) Using a company of your choice design a cleaner production plan and select suitable waste minimization techniques. [10]

Question 4

- a) Explain in detail the various pollution control techniques. [10]
- b) Discuss the elements of an Environmental Management System. [10]

Question 5

- a) Define life cycle assessment [LCA] [2]
- b) How would you explain the LCA methodology to an engineer who intends to implement it? [18]

Question 6

- a) Explain the concept of lean manufacturing. [2]
- b) Give an account of the various sources of waste or types of waste that are found in a manufacturing plant. [18]

Question 7

- a) What role is played by environmental indicators in keeping the environment clean? [2]
- b) Explain the key environmental indicators. [18]

END OF EXAMINATION