

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY



FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING

MEng IN MANUFACTURING ENGINEERING AND OPERATIONS MANAGEMENT

Main Examination

COURSE : ENVIRONMENTAL CONSCIOUS MANUFACTURING
CODE : TIE 6221
DATE : JANUARY 2013
DURATION : 3 HOURS

INSTRUCTIONS AND INFORMATION TO CANDIDATE

1. Answer any **five (5) questions**
 2. All other questions carry **20 marks** each
 3. This paper contains seven **(7)** questions
 4. There three (3) printed pages
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QUESTION 1

- a) Outline the main stages in setting up an Environmental Management System (EMS) and using appropriate examples, discuss the role of an EMS in an enterprise. [10]
- b) Discuss in detail what constitutes the environment in a manufacturing setup? Explain how each aspect is affected. [10]

QUESTION 2

- 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 3

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 4

- 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 5

- a) Explain what is meant by quality environment? What are its indicators [10]
- b) Discuss the elements of an Environmental Management System [10]

QUESTION 6

- a) Why is Waste Management a key issue in Environmental Conscious Manufacturing? [8]
- b) Explain in detail six pollution control techniques; discuss their advantages and disadvantages [6]
- c) Can communities benefit from ISO series certification? Discuss how [6]

QUESTION 7

- a) What is Green Engineering? [5]
- b) What are the goals of Green Engineering? [6]
- c) Discuss the term eco-design with references to Environmentally Conscious Manufacturing. [5]
- d) What are the impacts of lean manufacturing on the environment [2]
- e) Identify and Explain waste associated with lean production in a manufacturing environment [2]