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

MAINTENANCE ENGINEERING

TIE 3110

First Semester Supplementary Examination Paper

August 2015

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements:

Examiner's Name: Eng. William M. Goriwondo

INSTRUCTIONS

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
6.	20
7.	20
TOTAL (Choose any 5 questions)	100

Question 1

a) What are the major functions of a maintenance department in a modern manufacturing plant? [10]

b) Explain what characterizes Maintenance Management in the 21st century and state how engineers should adjust to keep abreast. [10]

Question 2

Give a detailed account of the steps used in developing a Preventive Maintenance Program. [20]

Question 3

a) Discuss the major challenges that organisations face in implementing Total Productive Maintenance (TPM). [15]

b) Overall Equipment Effectiveness (OEE) is a performance measure that is used in TPM. Show how it is calculated. [5]

Question 4

a) Why do organisations keep stock? [4]

b) What major decisions need to be made in Inventory Management? [8]

c) Explain the recommended spares stocking policy for the following types of spares
   i) Maintenance or Breakdown Spares, [2]
   ii) Insurance Spares, [2]
   iii) Capital Spares, [2]
   iv) Rotable Spares. [2]

Question 5

Discuss the concept of the Bath-tub in relation to maintenance and how it is used in determining Preventive Maintenance. [20]

Question 6

Explain the following terms as they relate to an Effective Maintenance Management system.

a) Maintenance Policy, [4]
b) Material Control, [4]
c) Work Order System, [4]
d) Equipment Records, [4]
e) Job Planning and Scheduling. [4]

Question 7

a) Describe how the following Predictive Maintenance Technologies are used.
   i) Thermography, [4]
   ii) Oil Analysis , [4]
   iii) Ultrasonic Analysis, [4]
   iv) Vibration Analysis. [4]

b) What are the advantages and disadvantages of Predictive Maintenance? [4]