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

WORKSHOP TECHNOLOGY I

TIE 1103

First Semester Supplementary Examination Paper

August 2015

This examination paper consists of 3 pages

Time Allowed: **3 hours**

Total Marks: **100**

Special Requirements: **Nil**

Examiner's Name: **Eng. Vennan Sibanda**

INSTRUCTIONS

1. Answer any four (5) questions
2. Each question carries 20 marks

MARK ALLOCATION

QUESTION	MARKS
1.	**20**
2.	**20**
3.	**20**
4.	**20**
5.	**20**
6	**20**
7	**20**
TOTAL	**100**

Question 1

a) With the aid of diagrams, demonstrate the metal cutting process. [5]
b) What is the use of cutting fluids in machining operations? [5]
c) For a given size of mild steel material, how would you arrive at the best cutting speed? [5]
d) Describe the various types of chips in metal cutting. [5]

Question 2

a) Explain the basic powder metallurgy process. [10]
b) In a powder metallurgy process, outline clearly the sintering process. [5]
c) Name and explain two important characteristics of metal powders. [5]

Question 3

a) Name and explain three (3) hand cutting tools found in the workshop. [5]
b) With the aid of a fully labeled diagram, show the working principle of a surface gauge (scribing block). [5]
c) Name and clearly explain five (5) measuring devices found in the workshop. [10]

Question 4

a) Outline the working principles of the vernier height gauge and vernier depth gauge, clearly showing their differences. [10]
b) With the aid of a diagram give an account of the working principle of a dial indicator explaining why it is important in the workshop. [5]
c) Slip gauges are precision measuring tools, where and why are they used? [5]

Question 5

a) Compare and contrast drilling, reaming and boring. [6]
b) With the aid of diagrams explain highlighting the differences between counter boring and counter sinking. [9]
c) Give a detailed account of generating both inside and outside threads on a work piece. [5]

Question 6

a) What is the function of flutes on a twist drill bit? [3]
b) Why are straight flute drills used for nonferrous materials? [3]
c) List the devices commonly used for holding the work on a drilling machine, and describe one (1). [5]
d) Name five (5) types of drilling machines and describe one (1). [9]

Question 7

a) Why are alloys important in engineering? [5]
b) Name and explain the composition of two non-ferrous alloys indicating their engineering applications. [5]
c) Why is heat treatment of metals a requirement in engineering? [5]
d) Explain the normalizing process. [5]

End of Examination