

### 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) b) c)	With the aid of diagrams, demonstrate the metal cutting process. What is the use of cutting fluids in machining operations? For a given size of mild steel material, how would you arrive at the best cutting s	[5] [5] speed?
d)	Describe the various types of chips in metal cutting.	[5] [5]
Qı	lestion 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]
Qı	lestion 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
c)	Name and clearly explain five (5) measuring devices found in the workshop.	[3] [10]
Qu a)	<b>Destion 4</b> Outline the working principles of the vernier height gauge and vernier depth clearly showing their differences.	gauge, [10]
b)	With the aid of a diagram give an account of the working principle of a dial indexplaining why it is important in the workshop.	licator
c)	Slip gauges are precision measuring tools, where and why are they used?	[5]
Qı	iestion 5	
a)	Compare and contrast drilling, reaming and boring.	[6]
b)	With the aid of diagrams explain highlighting the differences between counter borin counter sinking.	ng and [9]
c)	Give a detailed account of generating both inside and outside threads on a work	piece.
Qı	lestion 6	[3]
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 de one (1).	scribe [5]
d)	Name five (5) types of drilling machines and describe one (1).	[9]

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# Question 7

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

End of Examination

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