NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF TECHNICAL AND ENGINEERING EDUCTION AND TRAINING

WORKSHOP TECHNOLOGY& SAFETY

PTE 1256

First Semester Examination

May 2019

This examination paper consists of **3** pages

Time allowed: 3 hours

Total marks: 100

Examiner's name: Eng. A N Mnkandla

INSTRUCTIONS

1. Answer **Question One** and any **FIVE** questions from the two section.
2. Answer at least **Three Question**s from each section.
3. The paper has eight set questions, four from each section, (numbers in brackets represent allocated marks)
4. Question one carries **20 marks** and all the other questions carries **16 marks**.
5. There are Three**(3)** printed pages.

SECTION A

QUESTION 1

a) Give a detailed account of the role of an engineer regarding health and safety in an engineering workshop. [6]

b) What will you consider to be a safe working environment in an engineering plant? [4]

c) What role does the government and employer play in health and safety issues in the industry? [6]

d) List the costs associated with failure to observe health and safety issues at work. [4]

QUESTION 2

a) Clearly show the difference between accuracy and precision in measurement. [4]

b) What is a nominal surface? [2]

c) Differentiate between surface roughness and surface finish. [2]

d) Draw and label a micrometer showing 12.00mm. [8]

QUESTION 3

a) Name and explain the use of any four hand tools used in an engineering workshop.[4]

b) Explain time-based maintenance scheduling [3]

c) Define maintenance strategy. [3]

d) Give three examples of running maintenance. [3]

e) Name three general classifications of maintenance problems and give two examples of each. [3]

QUESTION 4

a) Why is maintenance so important to machinery and industry? [3]

b) Using diagrams explain direct and indirect metal extrusion processes. [5]

c) In rolling operations, explain with the aid of a diagram, swaging and radial forging processes. [4]

d) With aid of diagrams, explain metal extrusion, giving examples of products produced. [4]

SECTION B

QUESTION 5

a) What are the advantages and disadvantages of welding compared to other types of assembly operations? [8]

b) What is meant by the term faying surface? [2]

c) Define the term fusion weld. [2]

d) What is the fundamental difference between a fusion weld and a solid state weld? [2]

e) What is the difference between machine welding and automatic welding? [2]

QUESTION 6

a) Name and sketch the three weld joint types [3]

b) Define and distinguish the two terms heat transfer factor and melting factor in welding. [2]

c) Name two characteristics of a brazing metal [2]

d) Differentiate the following three metal joining processes
(i) soldering (ii) brazing and (iii) adhesive bonding. [3]

e) With the aid of neat diagrams, draw and label the types of ox-acetylene flames. State which one is best suited for welding. [6]

QUESTION 7

(a) Draw and label a single point cutting tool used on a lathe machine. [8]

(b) When setting a steel and iron production mine which four environmental considerations you would priorities before production and during production? [4]

(c) How would you recommend one to transport and store ox-acetylene gas bottles? [4]

QUESTION 8

a) Draw diagrams to represent the milling generating shape operations: (i) straight turning, (ii) taper turning,(iii) contour turning,(iv) plain milling,(v) profile milling [14]

b) Differentiate these two types of welding rods, Consumable welding rods and Non-Consumable welding rods. [2]

END OF EXAMINATION