



FACULTY OF ENGINEERING AND THE ENVIRONMENT

DEPARTMENT OF METALLURGICAL ENGINEERING

DEPARTMENT OF MINING ENGINEERING

WORKSHOP PRACTICE

EMI/EMR 1206

Final Examination Paper

June 2023

This examination paper consists of 2 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: Eng. M. Kanganga

INSTRUCTIONS

1. This question paper consists of 5 questions. Answer any four.
2. Questions 1 to 5 carry 25 marks each
3. Answer each question on a new page and write as eligible as possible

Additional Requirements

Calculator

Question 1

- a) There are numerous sources of accidents in industry; from revolving shafts to nips between gears and racks strips. What are some preventative methods that can be used for hazard control?
[15]
- b) Explain the success factors that are needed for an efficient Health and Safety Management System. [10]

Question 2

Using the principles of plant layout, explain how a plant layout may reduce the possibility of accidents in a work place. [25]

Question 3

Explain the technology of numerical control. In great detail, go on to explain how numerical control can affect accuracy, reliability and repeatability. [25]

Question 4

- a) In a workshop where safety-critical components of variable shapes and sizes are to be casted, explain why you would choose either die casting or sand casting. [10]
- b) A dense structure with sustained dimensional accuracy and free from blow-holes are properties required on a part to be die casted. With the help of diagram and process description, which of the die casting chambers would you use. [15]

Question 5

- a) What is the difference between a live center and a dead center, when these terms are used in the context of workholding in a lathe? [5]
- b) What is the difference between a machining center and a turning center? [5]
- c) Identify some of the reasons why machining is commercially and technologically important.
[10]
- d) Why is the orthogonal cutting model useful in the analysis of metal machining? [5]