FACULTY OF ENGINEERING AND THE ENVIRONMENT

DEPARTMENT OF MINING ENGINEERING

WORKSHOP PROCESSES AND PRACTICE

EMN/EMG 1206

Final Examination Paper

JUNE 2025

This paper consists of 2 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner: Eng. M. Kanganga

INSTRUCTIONS

1. This paper contains ONE section with FIVE questions.
2. Answer any FOUR questions.
3. Each question carries 25 marks.
4. Where a question contains subdivisions, the mark value of each subdivision is shown in brackets.
5. Illustrate your answer, where appropriate, with clearly labeled diagrams.
6. Start each question on a new page.
7. This paper comprises of 2 printed pages

Additional requirements:
Calculator

Question 1

a) Discuss the role of risk assessment and safety training in promoting a culture of safety awareness among workshop personnel. [10]
b) Evaluate the significance of regulatory compliance and enforcement in ensuring adherence to safety standards within a workshop. [5]
c) Propose strategies for continuous improvement and proactive safety management in workshops. [10]

Question 2

a) Discuss the operational principles, setup procedures, machining techniques, safety considerations, and quality control measures associated with using a center lathe in fabricating metal work pieces. [25]

Question 3

a) Explain the indicators used to determine the quality of the sand mold. [20]
b) A sand core has a volume 1875 cm^3 and is located inside a sand mold cavity. Determine the buoyancy force tending to lift the core during pouring of molten lead into the mold. [5]

Question 4

a) When using common mechanical methods for securing parts, explain why
   i. Conical heads should be avoided [3]
   ii. Bolt or screw heads that have a flat underside are preferred [3]
   iii. Flat washers are to be used under both nut and fastener heads [3]
   iv. Additional clearance may be needed if your part has slotted holes for attaching large plastic panels to metal or wood frames [3]
   v. In using a threaded fastener, adequate thread engagement in the fastener design should be provided [3]
b) What are the ways in which a threaded fastener can fail during tightening? Explain [10]

Question 5

a) Discuss the role of Computerized Maintenance Management Systems in modern industry for effective maintenance planning, execution, and asset management. [25]