THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION

789 METAL WORKING AND MECHANICAL PRACTICE

Time: 3 Hour. **Monday, 12th May 2003 a.m.**

Instructions

1. This paper consists of **eight (8)** questions.
2. Answer any **five (5)** questions.
3. Each question carries **twenty (20)** marks.
4. Non-programmable calculators may be used.
5. Communication devices, programmable calculators and any unauthorized materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

1. (a) Define the term “bench work” as used in metal working and mechanical practice.

   (b) Describe four operations performed during bench work and explain the purpose of each.

   (c) List four reasons why accuracy is important in bench work.

   (d) Identify four effects of poor accuracy in mechanical fitting operations.

2. (a) Define “metal cutting” and explain its role in fabrication processes.

   (b) Describe how a cold chisel is used in metal cutting and give three precautions to observe.

   (c) Explain the meaning of chisel angles and list three types of angles used in a flat chisel.

   (d) State two advantages and two disadvantages of using cold chisels compared to saws.

3. (a) Describe the function of a die in external threading operations.

   (b) Differentiate between split die and solid die.

   (c) Explain four steps followed when using a die to cut external threads.

   (d) State four causes of poor-quality threads when using dies.

4. (a) Describe the oxy-acetylene welding process.

   (b) Identify three types of oxy-acetylene flames and explain their uses.

   (c) State three functions of flux during oxy-acetylene welding.

   (d) List three safety precautions specific to handling acetylene gas cylinders.

5. (a) What is soldering? Explain its purpose in joining metal components.

   (b) Differentiate between soft soldering and hard soldering based on melting point and strength.

   (c) Describe four steps followed when soldering two copper wires together.

   (d) State three defects that can occur in soldered joints and explain their causes.

6. (a) Define “surface plate” and explain its use in marking out workpieces.

   (b) Describe three methods of checking flatness of a workpiece using a surface plate.

   (c) List three advantages of using a surface plate in layout operations.

   (d) Identify three limitations of surface plates in workshop practice.

7. (a) What is the purpose of using cutting fluids during machining?

   (b) List three types of cutting fluids and state one application for each.

(c) Explain three effects of not using cutting fluid during a machining operation.

(d) State three environmental or health precautions to take when using cutting fluids.

8. (a) Explain the purpose of countersinking in metal working.

(b) Describe how to perform a countersink operation correctly.

(c) Identify three types of countersinks and their suitable applications.

(d) State two reasons for using countersinks in drilled holes.