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, 13th May 2002 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 “hand tools” as used in mechanical workshop practice.

   (b) Describe four types of hand tools used in bench work and explain the function of each.

   (c) Explain the care and maintenance of hand tools to ensure their durability.

   (d) State four common hazards associated with improper use of hand tools in the workshop.

2. (a) Explain the process of metal sawing using a hand hacksaw.

   (b) Identify four causes of blade breakage during sawing and give preventive measures for each.

   (c) Describe how a junior hacksaw differs from a standard hand hacksaw.

   (d) State three safety precautions to observe when using a hand hacksaw.

3. (a) Define the term “forging” and state its purpose in metal shaping.

   (b) Explain the function of the following forging tools: (i) Anvil (ii) Swage block (iii) Fuller (iv) Tongs

   (c) Outline four procedures for forging a round bar into a flat shape.

   (d) State three advantages of forging over casting in mechanical production.

4. (a) Define gas welding and list two types of gases used in the process.

   (b) Explain the function of each of the following parts in a gas welding setup: (i) Regulator (ii) Hose (iii) Nozzle (iv) Cylinder

   (c) Give three differences between neutral flame and oxidizing flame.

   (d) List three safety precautions to be taken when using gas welding equipment.

5. (a) Explain the function of a vernier caliper and give one use.

   (b) Describe four steps to take when measuring a cylindrical object using a vernier caliper.

   (c) Give three limitations of a vernier caliper when used in workshop measurements.

   (d) Explain how to avoid parallax error when reading from a vernier scale.

6. (a) Define reaming and give two purposes of the process.

   (b) Differentiate between hand reamers and machine reamers in terms of structure and application.

   (c) Explain how to perform internal reaming on a drilled hole.

   (d) State four factors that affect the accuracy of a reamed hole.

7. (a) What is meant by the term “filing allowance” in fitting?

   (b) Explain the effect of using an incorrect filing allowance on a metal component.

   (c) Describe the method of draw filing and its application.

   (d) List four reasons why files may wear out prematurely.

8. (a) Describe four methods used for holding a workpiece during bench work.

   (b) Give three reasons why it is important to firmly secure the workpiece before carrying out an operation.

   (c) Describe how a bench vice can be maintained to prolong its service life.

   (d) State two disadvantages of using damaged or worn-out workholding devices.