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, 09th May 2005 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 “tolerance” in mechanical measurement.

   (b) (i) Explain the importance of tolerances in mechanical fitting.

   (ii) State three effects of poor tolerance control in mechanical assemblies.

   (c) Describe four types of fit used in mechanical engineering.

   (d) Explain how limits and fits relate to the concept of interchangeability.

2. (a) What is a hacksaw blade and what is its function in the workshop?

   (b) (i) Describe two types of hacksaw blades and give one use for each.

   (ii) Explain two precautions when storing hacksaw blades.

   (c) Give three causes of inaccurate cuts when using a hand hacksaw.

   (d) State four measures to maintain accuracy when sawing metal manually.

3. (a) Explain the difference between ferrous and non-ferrous metals.

   (b) Identify four examples of non-ferrous metals and state one use of each.

   (c) (i) List three reasons for using non-ferrous metals in mechanical construction.

   (ii) State two limitations of ferrous metals in engineering.

   (d) Explain the term “metal alloy” and give two examples used in workshop practice.

4. (a) Define the term “screw thread” and state its function in mechanical fastening.

   (b) Differentiate between metric threads and imperial threads.

   (c) Explain the following terms in relation to screw threads:

   (i) Pitch

   (ii) Crest

   (iii) Root

   (iv) Major diameter

   (d) List four defects that can occur during threading and suggest one solution for each.

5. (a) What is welding distortion and how does it occur?

   (b) (i) Describe three methods used to control distortion during welding.

   (ii) State two consequences of ignoring distortion in welded components.

(c) Explain the difference between intermittent weld and continuous weld.

(d) Give four reasons why weld inspection is important in metal fabrication.

6. (a) Define “riveting” and give two common types of rivets.

(b) (i) Explain four steps involved in performing hand riveting.

(ii) State two advantages of riveting over welding in sheet metal work.

(c) Describe two tools used during riveting and their functions.

(d) State three causes of failure in riveted joints.

7. (a) Explain the term “machine maintenance” and state its importance in workshop operations.

(b) Identify four types of maintenance applied to mechanical workshop equipment.

(c) (i) Describe two consequences of neglecting routine maintenance.

(ii) State two daily checks to be performed on a lathe machine before use.

(d) Outline three safety precautions to observe during machine maintenance.

8. (a) What is meant by “tool wear” and how does it affect machining operations?

(b) (i) List three types of tool wear.

(ii) Describe two methods of reducing tool wear during cutting operations.

(c) Explain the significance of tool material selection in high-speed machining.

(d) State four symptoms that indicate a cutting tool needs to be replaced.