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, 10th May 2010 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) What is “rough filing” and how does it differ from “smooth filing”?

   (b) (i) State three types of files used in fitting work.

   (ii) Describe two types of file cuts and their applications.

   (c) Explain four precautions to be taken when using files.

   (d) List two advantages and two disadvantages of using files in metalwork.

2. (a) Define the term “limit gauge” in mechanical measurement.

   (b) (i) Explain the difference between a “go” and a “no-go” gauge.

   (ii) List three advantages of using limit gauges in production.

   (c) Describe how a plug gauge is used to check a drilled hole.

   (d) Give four reasons why gauges must be regularly calibrated.

3. (a) What is meant by “drill runout” in machining?

   (b) (i) List three causes of drill runout.

   (ii) State two effects of runout on hole quality.

   (c) Explain how to check and correct runout on a drilling machine.

   (d) Describe four measures to ensure accurate hole positioning.

4. (a) Define “power hacksaw” and give two of its main uses.

   (b) (i) State three differences between a power hacksaw and a hand hacksaw.

   (ii) Describe two maintenance practices for power hacksaws.

   (c) List four safety precautions to observe when using a power hacksaw.

   (d) Explain the function of the blade tensioning mechanism in a hacksaw.

5. (a) What is meant by “dead centre” in lathe operations?

   (b) (i) State the function of a live centre and a dead centre.

   (ii) Explain two differences between them.

   (c) Describe the procedure for mounting a workpiece between centres.

   (d) List four benefits of turning between centres in a lathe machine.

6. (a) Define “undercut” in welding and explain how it affects weld strength.

(b) (i) Give three causes of undercut in arc welding.

(ii) Describe two ways to prevent undercut.

(c) State three visual indicators of a properly welded joint.

(d) List four welding defects other than undercut.

7. (a) What is “riveting set” and what is it used for?

(b) (i) List three types of rivet heads.

(ii) Explain how to form a rivet head manually.

(c) Describe how to inspect a completed riveted joint.

(d) State two advantages and two limitations of riveted joints.

8. (a) Define “bending allowance” and state its significance in sheet metal work.

(b) (i) Explain three factors that affect bending allowance.

(ii) List two common tools used for bending sheet metal.

(c) Describe the process of making a 90-degree bend on a metal sheet.

(d) Give two causes of cracks during sheet metal bending and how to avoid them.