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 2016 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 “cold working” and mention two examples.

   (b) (i) State four advantages of cold working processes.

      (ii) Explain the effect of cold working on metal grain structure.

   (c) Describe how cold rolling is performed.

   (d) State four safety precautions observed during cold working operations.

2. (a) What is a “micrometer screw gauge”?

   (b) (i) Identify three main parts of a micrometer and explain their functions.

      (ii) Explain the procedure of taking a measurement using a micrometer.

   (c) Describe how to read a micrometer with a main scale reading of 7.5 mm and thimble reading of 0.28 mm.

   (d) State four common errors made when using a micrometer and how to avoid them.

3. (a) Define “spot welding” and explain its principle.

   (b) (i) State three components of a spot welding machine.

      (ii) List three metals suitable for spot welding.

   (c) Describe the steps for making a spot weld.

   (d) State four limitations of spot welding in production.

4. (a) What is meant by “grit size” in abrasive wheels?

   (b) (i) Differentiate between coarse grit and fine grit.

      (ii) State the significance of grit size in grinding operations.

   (c) Explain how to select an abrasive wheel for grinding mild steel.

   (d) State four safety rules when handling and storing abrasive wheels.

5. (a) Define the term “reaming” and state its purpose.

   (b) (i) List two types of reamers used in workshops.

      (ii) Explain how reaming differs from drilling.

   (c) Describe the correct procedure of reaming a hole after drilling.

   (d) State four precautions to observe when performing reaming operations.

6. (a) What is meant by “center drilling”?

(b) (i) Explain why center drilling is done before turning operations.

(ii) State two types of center drills.

(c) Describe how to correctly perform center drilling on a lathe.

(d) State four effects of improper center drilling.

7. (a) Define “tolerance” in the context of engineering fits.

(b) (i) Give two examples of tolerance applications in metal parts.

(ii) Explain the consequences of ignoring tolerances in production.

(c) Describe the procedure for calculating limits of tolerance for a shaft of 20 mm with ±0.02 mm.

(d) State four benefits of proper tolerance control in machining.

8. (a) What is a “drill press” and what is its function?

(b) (i) Identify three parts of a drill press and explain their use.

(ii) State three advantages of using a drill press over a hand drill.

(c) Describe the steps involved in operating a drill press safely.

(d) State four hazards associated with drill press operations and how to prevent them.