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 2013 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 “lathe chuck” and explain its function.

   (b) (i) State two types of lathe chucks.

   (ii) Describe one advantage of each type mentioned.

   (c) Explain how to safely mount a workpiece using a three-jaw chuck.

   (d) List four precautions to observe when working with a lathe chuck.

2. (a) What is “keyway” in mechanical engineering?

   (b) (i) State three methods used for cutting keyways.

   (ii) Give one advantage of each method stated.

   (c) Explain the purpose of keyways in power transmission.

   (d) State four causes of failure in keyway joints.

3. (a) What is meant by “machine vice”?

   (b) (i) List three uses of a machine vice in mechanical workshops.

   (ii) Explain the difference between machine vice and bench vice.

   (c) Describe how to mount and align a machine vice on a drilling machine.

   (d) List four maintenance practices for a machine vice.

4. (a) Define “arc blow” in arc welding.

   (b) (i) State two types of arc blow.

   (ii) Describe two methods of preventing arc blow during welding.

   (c) Explain how arc blow affects the quality of the weld.

   (d) List four welding positions and where each is commonly used.

5. (a) What is meant by “bore gauge”?

   (b) (i) State the difference between a telescopic gauge and a dial bore gauge.

   (ii) Give one advantage of each gauge mentioned.

   (c) Describe the procedure for measuring an internal bore using a bore gauge.

   (d) State four possible causes of inaccurate bore measurements.

6. (a) Define the term “reamer runout” and explain how it occurs.

(b) (i) State three causes of runout during reaming.

(ii) Give two effects of excessive runout on hole quality.

(c) Describe how to reduce reamer runout during machining.

(d) State four properties of a good quality reamer.

7. (a) What is “die threading”?

(b) (i) List two types of dies used for external threading.

(ii) Explain how each is held and used during the process.

(c) Describe how to check the accuracy of an external thread after cutting.

(d) State four causes of thread failure after die cutting.

8. (a) Define “back gear” in a centre lathe.

(b) (i) State the function of back gear in turning operations.

(ii) Describe two conditions when back gear should be used.

(c) Explain how to engage the back gear system in a lathe.

(d) State four possible problems that may arise from improper use of back gear.