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, 11th May 2009 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 “thread cutting” and where is it applied in mechanical work?

   (b) (i) Explain the difference between internal and external threads.

   (ii) List three tools used for cutting internal threads.

   (c) Describe four factors that affect the quality of cut threads.

   (d) State four safety precautions to observe during thread cutting.

2. (a) Define the term “lathe bed” and describe its function.

   (b) (i) State two materials used to construct a lathe bed.

   (ii) Explain two properties that make those materials suitable.

   (c) Describe the alignment procedure of headstock and tailstock on a centre lathe.

   (d) List four problems that may result from misalignment of the lathe bed.

3. (a) Define “repetitive production” and explain its significance in workshop operations.

   (b) (i) List three examples of jobs suited for repetitive production.

   (ii) State two tools or devices used to assist in repetitive tasks.

   (c) Describe how jigs and fixtures contribute to speed and accuracy in repetitive production.

   (d) Explain four challenges faced in managing repetitive production in small workshops.

4. (a) What is “shank” in cutting tools and what is its role?

   (b) (i) Identify two types of shank configurations.

   (ii) State two considerations when selecting a shank type for a job.

   (c) Describe how the shank affects tool holding and performance.

   (d) List four common causes of tool breakage related to the shank area.

5. (a) Define the term “bevel protractor” and describe its use.

   (b) (i) State three advantages of using a bevel protractor.

   (ii) Explain the difference between a bevel protractor and a try square.

   (c) Describe the correct procedure for measuring an angle using a bevel protractor.

   (d) List four precautions when using and storing a bevel protractor.

6. (a) What is a “flatness test” in fitting and why is it important?

(b) (i) List three tools used in checking flatness.

(ii) Explain how to perform a flatness test using a surface plate and feeler gauge.

(c) State four consequences of working with a warped surface.

(d) Give two advantages and two disadvantages of manual flatness testing.

7. (a) Define “clearance” in fitting operations.

(b) (i) Explain two reasons for providing clearance between mating parts.

(ii) List three methods of checking clearance in workshop practice.

(c) Describe the importance of proper clearance in rotating mechanical assemblies.

(d) State four problems caused by incorrect clearance in machine components.

8. (a) What is “vibration” in machines and how does it affect operations?

(b) (i) State three causes of machine vibration.

(ii) Describe two methods of reducing or controlling vibration.

(c) Explain the effects of continuous vibration on tools and workpieces.

(d) List four safety measures when working with machines that produce vibration.