

**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, 11<sup>th</sup> May 2009 a.m.**

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**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).

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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.