

**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, 08th May 2017 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).

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1. (a) Define the term “thread cutting”.
 - (b) (i) State four types of thread cutting tools used in metal work.
 - (ii) Describe how external threads are cut using a die.
 - (c) Explain the importance of using cutting lubricant during thread cutting.
 - (d) State four precautions observed when cutting threads manually.
2. (a) What is a “lathe machine”?
 - (b) (i) Identify four main parts of a lathe and explain their functions.
 - (ii) State two types of lathe operations.
 - (c) Describe how facing operation is performed on a lathe.
 - (d) State four safety rules when operating a lathe.
3. (a) Define the term “tempering” in heat treatment.
 - (b) (i) Explain the purpose of tempering hardened steel.
 - (ii) State the colour range used to control tempering temperature.
 - (c) Describe the procedure of tempering a chisel.
 - (d) State four results of overheating during tempering.
4. (a) What is “riveting” and where is it commonly used?
 - (b) (i) State three types of rivet heads.
 - (ii) Explain the difference between cold riveting and hot riveting.
 - (c) Describe the procedure of forming a rivet joint.
 - (d) State four defects that may occur in riveted joints.
5. (a) Define “die” as used in metal shaping.
 - (b) (i) State two differences between blanking and punching dies.
 - (ii) List three materials used to manufacture dies.
 - (c) Explain the working principle of a compound die.
 - (d) State four maintenance practices of die sets.

6. (a) What is “hand tapping”?
- (b) (i) Mention the three taps used in internal threading.
 - (ii) Describe the tapping procedure for making an internal thread.
 - (c) Explain how to determine the correct tap drill size.
 - (d) State four common problems encountered during tapping and their solutions.
7. (a) Define the term “soldering”.
- (b) (i) Differentiate between soft soldering and hard soldering.
 - (ii) State three tools used in soldering operations.
 - (c) Describe the steps involved in making a soldered joint.
 - (d) State four precautions to observe when soldering metal parts.
8. (a) What is “metal fatigue”?
- (b) (i) Explain how cyclic loading contributes to fatigue failure.
 - (ii) Give two examples of parts affected by metal fatigue.
 - (c) Describe methods used to reduce fatigue failure in mechanical components.
 - (d) State four signs indicating that a metal part is experiencing fatigue.