**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 2015 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).

1. (a) Define the term “surface finish” in metalworking.

   (b) (i) State four factors that affect surface finish during machining.

   (ii) Explain the importance of surface finish in mechanical components.

   (c) Describe how surface finish is measured in a workshop.

   (d) State four defects that can affect the quality of surface finish.

2. (a) What is a “scribing block” and how is it used in metal layout work?

   (b) (i) Mention three components of a scribing block.

   (ii) Describe how to set a scribing block for marking a line parallel to a datum surface.

   (c) Explain why marking out is important in metalwork.

   (d) State four safety precautions when using layout tools.

3. (a) Define the term “machine maintenance”.

   (b) (i) Mention four types of machine maintenance.

   (ii) Explain how each type contributes to machine reliability.

   (c) Describe the procedure for performing routine maintenance on a lathe machine.

   (d) State four effects of poor maintenance on workshop machines.

4. (a) What is “clearance fit” in engineering assembly?

   (b) (i) Give two examples of clearance fit in real-world applications.

   (ii) Explain the difference between clearance fit and interference fit.

   (c) Describe how clearance fit is checked during inspection.

   (d) State four factors that determine the type of fit in mechanical assemblies.

5. (a) What is meant by “machine vibration”?

   (b) (i) State four causes of excessive vibration in workshop machines.

   (ii) Explain the effects of machine vibration on machining operations.

   (c) Describe methods used to control or reduce machine vibration.

   (d) Mention four signs that indicate a machine is vibrating abnormally.

6. (a) Define the term “die holder” and explain its function.

(b) (i) State three types of die holders.

(ii) Describe one application for each type.

(c) Explain the procedure for cutting external threads using a die holder.

(d) State four precautions to observe when using a die holder.

7. (a) What is “lubrication” and why is it necessary in metal cutting?

(b) (i) List four types of lubricants used in workshop machines.

(ii) Explain how each lubricant functions in its application.

(c) Describe how to apply lubrication during a drilling operation.

(d) State four problems that may result from lack of lubrication.

8. (a) Define “tool rest” as used in grinding operations.

(b) (i) State two reasons why tool rest adjustment is important during grinding.

(ii) Describe how to properly adjust a tool rest before grinding.

(c) Explain the dangers of incorrect tool rest setting in bench grinding.

(d) State four safety measures when using grinding machines.