THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION

789 METAL WORKING AND MECHANICAL PRACTICE

(SUPPLEMENTARY)

Time: 3 Hours. **Year: 2011**

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 broaching and its applications.

   (b) Explain the types of broaches with examples.

   (c) List two advantages of broaching.

2. (a) Explain shaping and its applications.

   (b) Describe four safety measures when using a shaping machine.

   (c) Outline three types of shaping operations.

3. (a) Define planing and its importance in workshop practice.

   (b) Explain four advantages of planing over other cutting methods.

   (c) Describe two types of planers and their applications.

4. (a) Explain brazing and its advantages.

   (b) List two types of brazing alloys with examples.

   (c) Outline two factors affecting the effectiveness of brazing.

5. (a) Explain filing and its purposes in workshop practice.

   (b) Describe three methods of filing:

      i) Draw filing

      ii) Push filing

      iii) Curved filing

   (c) List four points for achieving good filing results.

6. (a) Describe the purpose of a power hacksaw.

   (b) List four advantages of using a power hacksaw.

   (c) Identify two materials used for making hacksaw blades.

7. (a) A 120 mm × 50 mm × 30 mm workpiece is to be milled. Calculate:

   i) Material removal rate if feed is 0.2 mm/tooth, spindle speed is 900 rev/min, and depth of cut is 3mm.

   ii) Power required if cutting force is 700 N.

   (b) Determine time required to remove a length of 100 mm.

   (c) Calculate cutting speed.

8. (a) A hole of 25 mm diameter is drilled and reamed in a steel plate of 20 mm thickness. Calculate:

   i) Reaming allowance if final hole diameter is 25.2 mm.

   ii) Spindle speed for drill to achieve cutting speed of 30 m/min.

   (b) Determine feed per revolution if hole is drilled in 15 seconds.

   (c) Calculate torque if cutting force is 400 N at radius 12.5 mm.