THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

095 **FITTING AND TURNING**
(For Both School and Private Candidates)

Time: 3 Hours **Wednesday, 15th November 2017 a.m.**

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Instructions

1. This paper consists of sections A, B and C with a total of **sixteen (16)** questions.
2. Answer **all** questions in sections A and B, and **three (3)** questions from section C.
3. Calculators, cellular phones and unauthorized materials are **not** allowed in the examination room.
4. Write your **Examination Number** on every page of your answer booklet(s).
5. Use, $\pi = \frac{22}{7}$ where necessary.

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SECTION A (10 Marks)

Answer **all** questions in this section.

1. For each of the items (i) – (x), choose the correct answer from among the given alternatives and write its letter beside the item number in the answer booklet provided.

(i) Which of the following is used to hold firmly the workpiece for drilling?
A Bench vice. B Machine vice. C G-clamp.
D Vee plate. E Angle plate.

(ii) What is the tolerance from the dimension expressed as $40^{+0.055}_{-0.035}$?
A 0. 09 mm. B 0.035 mm. C 0.009 mm.
D 0.020 mm. E 0.055 mm.

(iii) In which of the following machines is the cutting tool in Figure 1 fixed?
A Shaper machine. B Milling machine. C Grinding machine.
D Lathe machine. E Drilling machine.

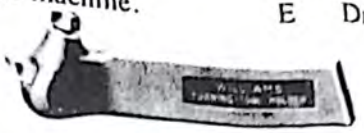

Figure 1

(iv) In a unilateral system of tolerance, the tolerance is allowed on
A one side of the actual size B both sides of the actual size
C both sides of the norminal size D either sides of the actual size
E one side of the norminal size.

(v) Which of the following cutting tools is used to separate workpiece into two parts on lathe machine?
A Knurling tool. B Parallel turning tool. C Parting off tool.
D Round nose tool. E Taper turning tool.

(vi) Catch plate is an accessory used in lathe machine when
A turning without tailstock support B turning between centres
C setting the tool at centre axis D turning at high speed
E turning with a compound rest.

(vii) The algebraic difference between the maximum limit and the basic size is called
A actual deviation B lower deviation C tolerance
D upper deviation E fundamental deviation.

(viii) The screw extractor is a tool used to remove
A a broken tap B a first tap C a clogged tap
D a starting tap E a clearing tap.

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(ix) Which of the following operations is carried out on the apparatus in Figure 2?
A Forging. B Up cutting. C Threading. D Knurling. E Down cutting.

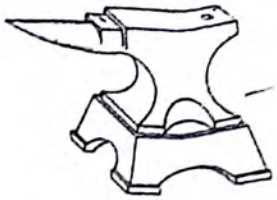

Figure 2

(x) What is the purpose of knurled portion of the workpiece?
A To produce stepped diameter on a workpiece.
B To produce a thread on a workpiece.
C To reduce the diameter of a workpiece.
D To make a neck on a workpiece.
E To facilitate strong griping on a workpiece.

SECTION B (30 Marks)

Answer all questions in this section.

2. Mention three uses of surface gauges in the workshop. – Scribing parallel lines

3. Enumerate six tools used in sheet metal work. Mallets, Stakes, Tin man's anvil, hand
half moon, creasing moon, formers

4. (a) What is lathe dog with regard to lathe machine?
(b) What is the use of a tool in Figure 3.

– Die – cutting external thread.

Figure 3

5. Give three types of natural abrasives. Diamond, Emery, sandstone

6. List three types of twist drills.-

7. Define the following machine parts with regard to shaper machine:
(a) Ram. (b) Shaper head.

8. Give three examples of the two methods of joining metals in engineering.
1) Permanent
– Riveting
– Soldering
Temporary

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9. Study Figure 4, then answer the following questions:
   (a) What is the name of the apparatus shown in Figure 4?
   (b) Name the parts of the apparatus indicated by letters a and b.

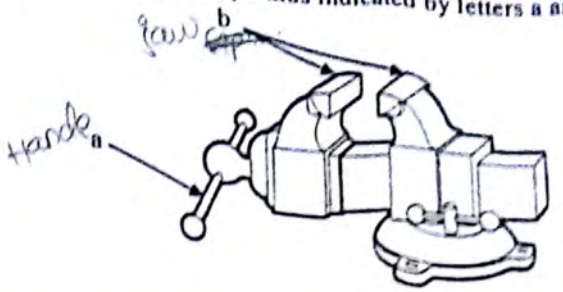

Figure 4

10. Give the uses of the following types of files:
   (a) Single cut file.
   (b) Double cut file.

11. State three safety precautions to be observed before starting to drill a hole.

SECTION C (60 Marks)

Answer **three (3)** questions from this section.

12. (a) What are the four important general safety practices to be considered when working with rotating machines? **(10 marks)**

   (b) (i) Define micrometer screw gauge.
   (ii) Briefly explain how is the micrometer screw gauge used. **(10 marks)**

13. (a) (i) Define lathe machine.
   (ii) Describe four main parts of a lathe machine. **(14 marks)**

   (b) Describe four major parts of the carriage of a lathe machine. **(06 marks)**

14. (a) Describe the problems that can be associated with drilling holes in sheet metal and state how to overcome the problems. **(10 marks)**

   (b) Briefly describe the following parts of a twist drill:
   (i) The web. (ii) The point. **(10 marks)**

15. (a) Distinguish between the following with regard to lathe machine: **(16 marks)**
   (i) Material removal rate and depth of cut. (ii) Cutting speed and feed rate.
   (iii) Catch or driving plate and faceplate. (iv) Three jaw chuck and four jaw chuck.

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(b) Calculate the number of revolutions per minute of a lathe machine spindle turning round bar of 14 mm diameter if the cutting speed of the material is 40 m per second. **(04 marks)**

16. (a) Calculate the time required for drilling the hole when a workpiece of a thickness of 100 mm is drilled by using a twist drill of diameter of 70 mm. Assume the cutting speed of 44 m/min and feed rate of 0.4 mm/rev are used. Neglect the length of approach. **(10 marks)**

(b) Briefly explain the following fits with regard to Limits and Fits: **(10 marks)**

(i) Fit.
(ii) Push fit.
(iii) Press fit.
(iv) Running fit.

Clearance

* Precision
* Accuracy
* Interchangeability

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