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**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

Tuesday, 15th November 2016 a.m.

Instructions

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

SECTION A (10 Marks)

Answer all questions in this section.

1. For each of the items (i) – (x), choose the correct answer among the given alternatives and write its letter beside the item number in the answer booklet provided.
- (i) The accuracy of micrometers, calipers and dial indicators can be checked by
A a Feller gauge B a Slip gauge C a Ring gauge
D a Plug gauge E a Snap gauge.
- (ii) In a bilateral system of tolerance, the tolerance is allowed on
A one side of the actual size B one side of the nominal size
C both sides of the actual size D both sides of the nominal size
E not of either sides of actual or nominal size.
- (iii) Which of the following chisel is used for cutting key ways?
A Round nose chisel. B Half round nose chisel. C Diamond pointed chisel.
D Flat chisel. E Cape chisel.
- (iv) What are the uses of fullers tool in fitting and turning workshops?
A Finishing flat surfaces. B Punching a hole.
C Finishing punched holes. D Necking down a piece of work.
E Making round shapes.
- (v) In a four high rolling mill, there are four rolls out of which
A one is working roll and three are backing up roll
B all of the four are working rolls
C two are working rolls and two are backing up rolls
D three are working rolls and one is backing up roll
E all of the four are backing up rolls.
- (vi) To prevent the body of the blade from jamming in the saw cut, the teeth of blade are
A set B sharpened C strengthened D hardened E treated.
- (vii) When the dimension is expressed as $20^{+0.035}_{-0.025}$, then the tolerance is
A 0.60 mm B 0.06 mm C 0.01 mm D 0.006 mm E 0.025 mm.
- (viii) The grinding machine which can grind to close tolerance finish, harder and non-harder work is known as
A centreless grinder B cylindrical grinder C surface grinder
D pedal grinder E portable angle grinder.
- (ix) Parallel Turning is the operation which is performed on
A Drilling machine B Grinding machine C Milling machine
D Shaper machine E Lathe machine.

- (X) The part of twist drill that serves as a way of coolant penetration is known as
 A flutes B land C tips D shank E lips.

write

SECTION B (30 Marks)

Answer all questions in this section.

2. Define the following with regard to lathe machine:
 - (a) Feed rate.
 - (b) Setup of machine. *provide machine to work properly*
3. Describe the tool in Figure 1 as used in Fitting and Turning workshop.



Figure 1

4. Name three factors which affect the surface finishing of the machined work piece. *cutting speed, workpiece material, perpendicular feed mechanism*
5. Differentiate the carriage from apron with regard to lathe machine parts.
6. Sketch a scriber and explain its function in fitting and turning workshop. 
7. Distinguish the following materials as used on the grinding wheel.
 - (a) Abrasive. *cutting material in the grinding wheel e.g. Al₂O₃*
 - (b) Bond. *substance that will grain particles together*
8. State the functions of the following accessories:
 - (a) Mandrel.
 - (b) Face plate.
9. Differentiate between continuous chips and discontinuous chips. *mandrel / face plate*
10. Name three common holding devices used in drilling machine. *vice, steady, clamp*
11. Identify the tool in Figure 2 and state its function. *angle photo*

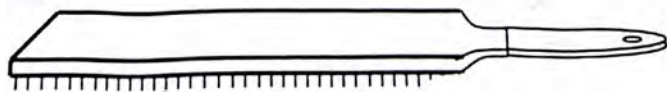


Figure 2

$$t = \frac{60.8}{N \times F}$$

SECTION C (60 Marks)

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

12. (a) A workpiece of a thickness of 50 mm is to be drilled a hole having a diameter of 35 mm. Calculate the time required for drilling the hole, assume the cutting speed of 22 m/min and feed rate of 0.2 mm/rev are used. Neglect the length of approach. **(10 marks)**

- (b) Outline five advantages which make an operator to opt using hydraulic drive in shaping machines. **(10 marks)**

13. (a) (i) Name the parts of the micrometer screw gauge in Figure 3.

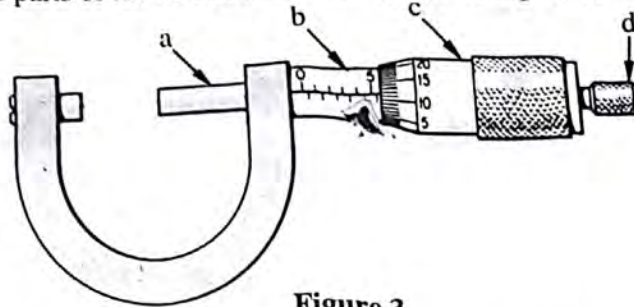


Figure 3

- (ii) Explain four procedures to follow when measuring the size of diameter using the micrometer. **(10 marks)**

- (b) Briefly describe the following types of calipers with respect to their shape and application:

- (i) Hermaphrodite calipers. (Odd – Leg Calipers)
- (ii) Spring – Loaded Calipers.
- (iii) Inside Caliper.
- (iv) Outside caliper.

(10 marks)

14. (a) (i) Give the name of filing methods shown in Figure 4 (i) and (ii).

- (ii) Briefly explain the methods of filing in Figure 4 (i) and (ii). **(10 marks)**

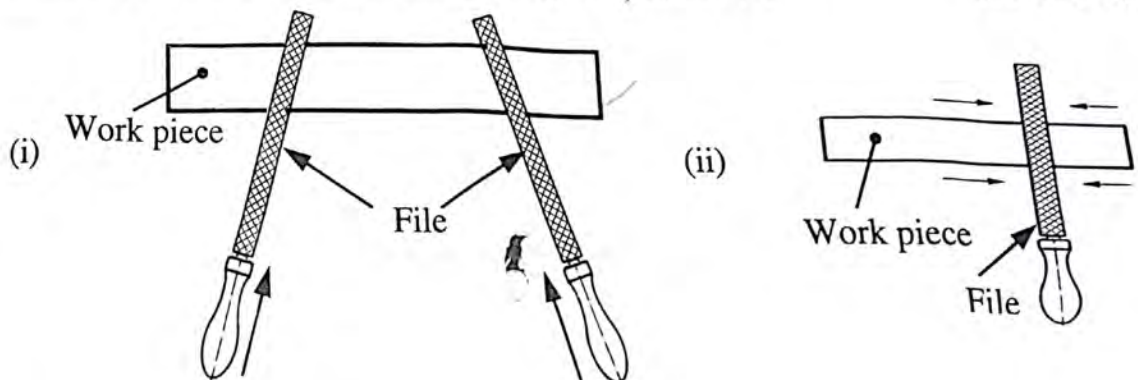


Figure 4

- (b) (i) Briefly describe 'pinning' as encountered in filing process, stating its effect and how it can be prevented and removed from a file.

- (ii) Describe the flat and square files according to their shapes and uses. (10 marks)
15. (a) Give the meaning of the standard marking system given on grinding wheel as: $A - 36 - H$ (07 marks)
 $- 6 - V - G$.
- (b) Write down six benefit of applying coolant during grinding operations. (06 marks)
- (c) What are the uses of the following wheel shapes: (07 marks)
- | | |
|----------------------------------|----------------------------|
| (i) Straight wheels | (ii) Tapered face wheels |
| (iii) Ring or cylindrical wheels | (iv) Flaring cup wheel |
| (v) Form grinding wheels | (vi) Mounted points wheels |
| (vii) Cup wheels. | |
16. (a) Describe three methods used for indexing in a milling machine. (15 marks)
- (b) Describe how spiral milling is performed in a milling machine. (05 marks)