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 **Monday, 17th November 2014 a.m.**

Instructions

1. This paper consists of sections A, B 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).

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SECTION A (10 Marks)

Answer **all** questions in this section.

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

(i) Which of the following are two groups of the reamers?
A Machine and Hand reamers. B Soft and Hand reamers.
C Hard and Hand reamers. D Machine and Hard reamer.
E Hard and Soft reamer.

(ii) In Fitting and Turning the screw driver is used for
A testing the electric current in screws B tightening and loosening grub screws
C tightening screws with electric current D tightening and loosening the screws
E loosening electric screws in a circuit.

(iii) What is the purpose of land on the twist drill?
A Increases drill strength. B Provide drill hole diameter
C Provide body clearance of the drill. D Protecting jamming of the drill.
E Allow coolant to penetrate to lips.

(iv) Metal fasteners can be divided in three main groups, these are
A Temporary, permanent and gluing joints B Riveting, screws and welding
C Welding, pining and riveting D Bolts, screws and riveting
E Bolts and nuts, screws and patterns.

(v) When drilling a hole on a workpiece by lathe machine, it is advised to start the hole with
A Prick drill B Centre drill C Offset drill
D Twist drill E Flat drill.

(vi) Which of the following is the cutting stroke of a shaper?
A Returning stroke. B Forward stroke C Idle stroke of the ram
D Back and forth E Driving stroke

(vii) Which type of the following hammer is suitable for riveting?
A Sledge hammer. B Straight pein hammer C Cross pein hammer
D Ball pein hammer E Brass hammer

(viii) The long work on lathe machine is supported against the pressure of cut by the use of
A three jaw chuck B four jaw chuck C steadies
D face plate E collect chuck

(ix) Soldering is a process of joining two pieces of metal together by an intermediate layer of a filler alloy called
A Brazing B Welding C Metal D Flux E Solder.

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(x) The purpose of dowel pins in Fitting and Turning is to
A locate pieces of works by bolting them
B locate pieces of works by gluing together
C join pieces of works by welding
D join and locate pieces of work by screws
E locate one piece of work accurately with another.

SECTION B (30 Marks)

Answer **all** questions in this section.

2. State and briefly explain three factors which must be considered when selecting speeds and depth of cut for shaper machine.

3. (a) List down three types of natural abrasives.
(b) Enumerate three types of bounding materials used for making grinding wheels.

4. Enumerate any three methods for producing tapers on a lathe.

5. Mention three uses of surface gauges in the workshop.

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

7. Write down three advantages of a radial drilling machine.

8. List down six common tools used in sheet metal work.

9. Name three factors which affect the surface finish of the machined work piece on lathe machine.

10. Write down six operations that can be performed on a lathe.

11. (a) Enumerate three types of chisel which are used in the workshop.
(b) Read and indicate the size of the diameter of the shaft measured by micrometer screw gauge Figure 1.

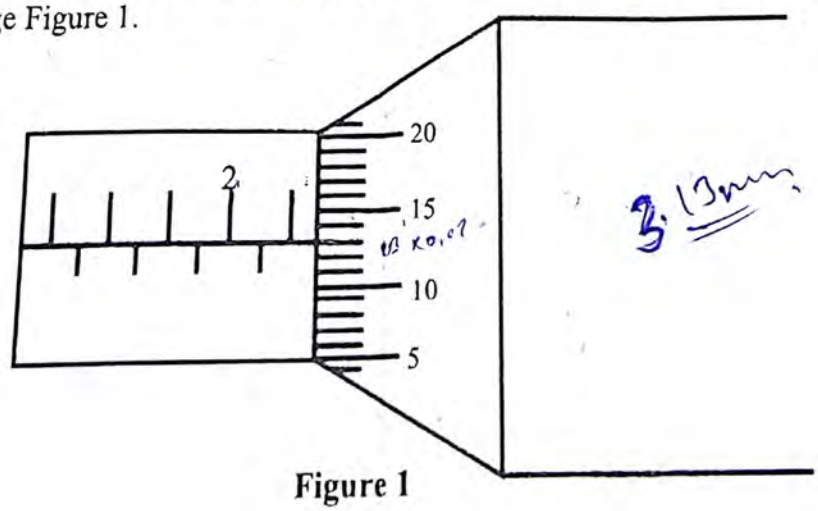

Figure 1

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SECTION C (60 Marks)

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

12. (a) Briefly describe the following parts of the drilling machine.
(i) Base (ii) Column (iii) Table (iv) Spindle **(8 marks)**

(b) Explain four functions served by the flutes of a twist drill. **(8 marks)**

(c) Sketch a twist drill with taper tang used in drilling machine and label the following parts:
(i) Land (ii) Drill lips (iii) Taper tang (iv) Flute length **(4 marks)**

13. (a) Explain five significance of the cutting fluid as used in machining operations. **(7.5 marks)**

(b) Provide five essential properties of cutting fluids in order to be of practical value in metal cutting operations. **(7.5 marks)**

(c) (i) Define soluble oil and briefly explain the function of its agents.
(ii) What is the use of straight oils? **(5 marks)**

14. (a) (i) What is the name of the machine shown in Figure 2 with regard to machine shop.
(ii) Give the names of the parts of the machine given in terms of letters a – j.
(iii) Describe the parts indicated by letters a, c, f, h and i with consideration to their functions. **(18 marks)**

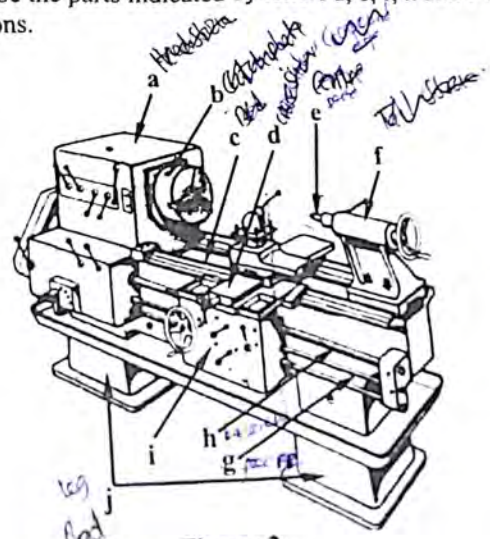

Figure 2

a - Headstock
b -
c - Bed
d -
f - Tailstock
e - Dead centre
h - Lead screw
g - Feed rod
i - Carriage apron
j - Leg

a = forms the main structure on which the head stock is fixed.
c =
f =
i =
h =
j = leg

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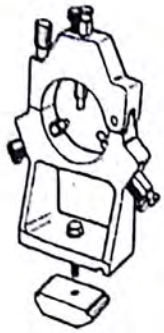
(b) What is the use of the device in Figure 3 as used in machine shop? **(2 marks)**



- used for holding long slender works

Figure 3

15. (a) Briefly explain the following terms used in grinding wheel selection.
(i) Grain size (ii) Grade (iii) Structure (iv) Bond **(4 marks)**
(b) (i) What is a wheel dresser with regard to grinding activities?
(ii) Briefly state when a diamond dresser is preferred for use? **(2.5 marks)**
(c) Describe the procedure on how a grinding wheel is mounted on a spindle. **(13.5 marks)**

16. (a) Describe three types of shaper used in the workshop with regard to methods of drive of the machine. **(6 marks)**
(b) Briefly explain how is the size of shaper specified? **(2 marks)**
(c) Calculate the number of the cycles per minute for shaping cast iron if the cutting speed is 25m/min. and stroke length is 250 mm. **(2 marks)**
(d) (i) Briefly explain how helical and plain cutters operate during machining on milling machine.
(ii) How helical teeth engage with work during machining on milling machine and what is the outcome of this engagement? **(6 marks)**

(e) Observe Figure 4 and answer the following questions:
(i) What is the name of the instrument given in Figure 4?
(ii) Give the names of the parts of the instrument indicated by letters 'a' and 'b' in Figure 4.
(iii) What is the use of the instrument in Figure 4? **(4 marks)**

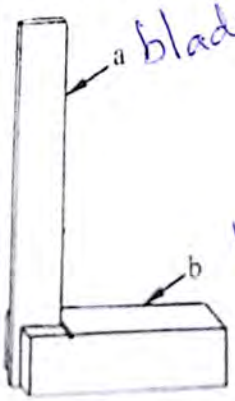


Figure 4

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