

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

**092**

**WORKSHOP TECHNOLOGY**  
(For Both School and Private Candidates)

**TIME: 3 Hours**

**Wednesday afternoon 10/10/2007**

**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. Electronic calculators are **not** allowed in the examination room.
4. Cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

S4S

This paper consists of 5 printed pages.

## 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.
- (i) One of the safety rules states that
- A run fast in the workshop
  - B wear loose clothings when working in machines
  - C make sure that all rotating parts of a machine are uncovered
  - ☒ D be safety minded all the time
  - E do not put warning tags on faulty machines.
- (ii) The algebraic difference between the upper and lower limits of the size is known as
- A zone
  - B allowance
  - C limit
  - D fit
  - ☒ E tolerance.
- (iii) One of the materials listed below does not melt easily at high temperatures.
- A Plastic material.
  - B Refractory material.
  - C Malleable material.
  - D Ductile material.
  - E Sintered material.
- (iv) The container that carries the charge to the blast furnace is called
- A ballast
  - ☒ B skip
  - C laddle
  - D tuyere
  - E blast pipe.
- (v) The furnace that controls accurately the temperature and atmosphere to produce high quality steel is
- A Bessemer converter
  - ☒ B electric furnace
  - C open Hearth furnace
  - D blast furnace
  - E cupola furnace.



- (vi) Zinc coating process on ferrous parts is called  
A vulcanizing  
B carburizing  
C tin plating  
D chrome plating  
✓ E galvanizing.
- (vii) When the micrometer spindle with 0.5 mm thread pitch is given three complete turns, it will advance a distance of  
A 0.5 mm  
B 0.05 mm  
C 0.03 mm  
D 0.15 mm  
✓ E 1.50 mm.
- (viii) A hard grade-grinding wheel is the one whose abrasive grains are  
A firmly held by the bond  
B easily removed when grinding  
C best suited to grind hard metals  
D best suited to grind without coolant  
E best for precision grinding.
- (ix) Hand operated feed mechanism enables the operator of the machine to feed the progress of drill through the material being cut. This is termed as  
A machine feed  
B sensitive feed  
C force feed  
D drill feed  
E operator feed.
- (x) To check the penetration of a drilled hole, one has to use  
A a ruler  
B a try square  
C an inside calliper  
✓ D a depth gauge  
E a feeder gauge.

### SECTION B (30 marks)

Answer **all** questions in this section.

2. Write down **two (2)** types of allowances as used in limits and fits.
3. List **three (3)** common ranges of metric micrometers.
4. Mention **two (2)** types of electric furnaces used for steel production. *Electric arc furnace. High-frequency furnace.*
5. Enumerate **three (3)** alloying elements in cast iron. *Copper, Nickel, Chromium*

6. List **three (3)** semi-finished products of hot rolling.
7. Mention **two (2)** kinds of grinding wheels mounted on bench grinders.
8. Give the ores for production of
- (a) pig iron. - *Hematite*
  - (b) magnesium. -
  - (c) aluminium. - *Alumina / bauxite*
9. Which process of heat treatment is suitable to subject the following to the stated conditions?
- (a) Mild steel to be hard? - *case hardening*
  - (b) Hardened steel to be tough? - *Tempering*
10. List **three (3)** types of cutting fluids that are used in machining operations. *soluble oil, synthetic fluid, straight cutting oil*
11. Mention **three (3)** forms of supply of engineering materials. *sheet, bars, strips*

### SECTION C (60 marks)

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

12. Define the following:
- (a) A dimension.
  - (b) Maximum allowance.
  - (c) Minimum allowance.
  - (d) Tolerance.
  - (e) Limits.
13. (a) Briefly explain what happens if steel is heated above the upper critical temperature and then allowed to cool
- (i) slowly - *Annealing*
  - (ii) by quenching. - *hardening*
- (b) What happens if steel is heated to the lower critical point? - *tempering*
14. (a) When balancing a grinding wheel, explain how you can distinguish between a balanced wheel and an unbalanced wheel?
- (b) What is truing of a wheel?



15. (a) Mention **two (2)** ways of holding drills in a bench drilling machine.  
(b) Give **two (2)** functions of T – slots on the work table of a pillar drilling machine.  
(c) How can spindle speeds of a bench drilling machine be changed?

- ✓ 16. (a) Mention the metal that replaces wrought iron. *mild steel.*  
(b) Explain why machining of wrought iron is difficult? *Because it is tough.*  
(c) What percentage of iron does pure wrought iron contain? *91.9% of iron.*  
(d) Give **two (2)** properties of wrought iron. *It resists corrosion, it can be easily forged.*