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.

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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.

(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.

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(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.

5. Enumerate **three (3)** alloying elements in cast iron.

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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. - sheets, 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?

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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? 99.9% of iron.

(d) Give **two (2)** properties of wrought iron. – It resists corrosion, it can be easy forged.

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