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, 7th October 2009 p.m.***

Instructions

1. This paper consists of sections A, B and C.
2. Answer **all** questions in section 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).

This paper consists of 4 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) Brass is an alloy of copper and
- A Zinc
- B iron
- C tin
- D aluminium E magnesium.

(ii) Iron ore with least percentage of iron content is
- A magnetite
- B pearlite
- C cementite
- D taconite E limonite.

(iii) Grades of cut in filling are in the following order:
- A rough, bastard, second cut, smooth, dead smooth
- B dead smooth, bastard, rough, second cut, smooth
- C dead smooth, rough, bastard, second cut, smooth
- D bastard, rough, second cut, smooth, dead smooth
- E bastard, second cut, rough, dead smooth, smooth.

(iv) The chief raw material in the production of iron and steel is
- A wrought iron
- B malleable iron
- C pig iron
- D gray iron
- E cast iron.

(v) Steels for making cutting tools, gauges, etc. are processed in
- A an open hearth furnace
- B a cupola furnace
- C a puddling furnace
- D a Bessemer converter
- E a crucible furnace.

(vi) Flux is used when soldering because it
- A melts after the solder
- B prevents oxides forming
- C covers the melting point of the solder
- D washes away surplus solder
- E raises the temperature of the solder.

(vii) Chilling process in cast iron is carried out to make it
A easy to machine
B have good appearance
C more malleable
D wear resistant
E more ductile.

(viii) Utensils made of stainless steel are good, mainly because they
A resist corrosion
B have good appearance
C are easy to wash
D are stronger
E resist heat.

(ix) Limestone in the iron and steel industry is used to
A give colour to the iron
B increase heat during melting
C make the iron or steel stronger
D make iron or steel easy to machine
E flux the impurities.

(x) At the end of the steel making process deoxidation is necessary before pouring the steel into ingot moulds, the deoxidisers added to remove the soluble iron oxide are
A Ferro- carbide, Ferro-silicon and aluminium
B Aluminium, Ferro-manganese and Ferro-silicon
C Lead, Copper and Aluminium,
D Ferro-copper, Ferro-tin and Ferro-silicon
E Aluminium, copper and lead.

SECTION B (30 Marks)

Answer **all** questions in this section.

2. Give two (2) main classifications of metals used in engineering. metal, non-metal.

3. What is the difference between measurement and gauging?

4. List down three (3) inputs in the production of pig iron. limestone, iron ore, coke

5. State three (3) purposes of flutes on taps and dies.

6. Mention the four (4) types of small amount of elements found in Pig iron. magnetite, Haematite, Limonite, Taconite

7. Describe briefly the term 'fatigue' as refers to metal testing?

8. Mention the three (3) constituents of Gun metal.

Copper, Tin, Zinc /3
88% 10%

9. Write short notes on the following terms.

   (a) Malleability

   (b) Ductility

   (c) Hardness

10. Describe briefly two types of tolerance. unilateral tolerance, Bilateral tolerance

11. Explain briefly three (3) media for heat treatment.

SECTION C (60 Marks)

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

12. With the aid of a sketch of a Blast furnace, explain the processes of producing Pig Iron.

13. The dimensions of a hole are:
    50.062 mm.

    50.000 mm.
    State the shaft dimensions (i.e. maximum and minimum shaft diameters) which would give the fit conditions of minimum clearance 0.025 mm to maximum clearance 0.102 mm.

14. Describe the safety precautions that should be followed when working on a workshop bench.

15. Explain five (5) effects of steel alloying elements.

16. Describe the following methods of Non-destructive testing of metal:

    (a) Penetration methods.

    (b) Magnetic Crack Detection method.

    (c) Electrical methods.

    (d) X-ray Examination methods.