THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

FORM TWO NATIONAL ASSESSMENT

090 MECHANICAL ENGINEERING

Time: 2:30 Hours **Year: 2021**

Instructions

1. This paper consists of sections **A, B** and **C** with a total of **ten (10)** questions**.**
2. Answer **all** questions.
3. Section **A** and **C** carry **fifteen (15)** marks each, section **B** carries **seventy (70)** marks.
4. Cellular phones and any unathorized materials are **not** allowed in the assessmenmt room.
5. Write your **Assessment Number** at the top right hand corner of every page.

FOR ASSESSOR'S USE ONLY		
QUESTION NUMBER	**SCORE**	**ASSESSOR'S INITIALS**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

2 303041 100264

SECTION A (15 Marks)

Answer **all** questions in this section

1. Choose the correct answer from the given alternatives and write its letter in the box provided.

   i) Which type of filling technique should be used for a good surface finish of the metal product?

   A. Single cut filing and double cut filing.

   B. Cross filing and draw filing.

   C. Draw filing and double cut filing.

   D. Single cut filing and cross filing.

   ii) Which of the following is an unsafe working habit that you should observe during material handling?

   A. Caring of too heavy load and tuck your chin in

   B. Gasping of the load firmly to the body and lifting

   C. Handling with leather sleeves and carrying too heavy load

   D. Wearing of PPE and lifting improperly the load.

   iii) How is the trained person having the ability to make technical drawings and write reports called?

   A. An Engineer

   B. A Technician

   C. A craft person

   D. An artisan.

   iv) What is the term used to describe the professional of applying the scientific principles in designing, developing and producing components?

   A. Science

   B. Technical

   C. Engineering

D. Mechanical.

v) Everyone working in the workshop is advised to put on PPEs when executing his/her job. What does PPE's stand for?

A. Personal Production Equipment

B. Personal Preventive Equipment

C. Personal Protective Equipment

D. Personal Permissible Equipment.

vi) Most of machine case and complicated heavy weights machine base are made with cast iron. Which property makes this type of iron materials most preferable to be used?

A. Machinability

B. Malleability

C. Fluidity

D. Workability.

vii) During working process of selecting a steel material for a certain job, it was observed that the material has higher amount of residue and coercive magnetic force. Which element causes the steel used to have this property?

A. Chromium

B. Vanadium

C. Manganese

D. Cobalt.

viii) Which type of fire extinguishers would you use to extinguish the fire resulted from electrical fault in the school workshop?

A. Dry powder, foam and water

B. Carbon dioxide, dry powder and sand

C. Carbon dioxide, foam and water

D. Carbon dioxide, water and sand.

ix) Oxy-acetylene flame is obtained after mixing oxygen gas with acetylene gas. What is the function of oxygen gas in that flame?

A. To burn the acetylene gas

B. To reduce smoke during burning

C. To support combustion

D. To reduce flame intensity.

x) A mechanist was performing a filing on metal work pieces A and B. The result shows that work piece A causes much pinning to the file than work piece B. What conclusion can you draw from that observation?

A. Work piece A is harder than work piece B

B. Work piece A is stronger than work piece B

C. Work piece A is soft than work piece B

D. Work piece A is tough than work piece B.

2. Match the properties of engineering materials in List A with the type of material in List B by writing a letter of the correct response to the corresponding item number.

LIST A	**LIST B**
i) It is an alloy of copper and zinc which contain small amount of lead, tin or aluminium. ii) It is an aluminium alloy iii) It has higher ability to resist corrosion iv)) It is steel with carbon percentage from 0.8 to 1.5 v) It is an alloy of copper and tin.	A. Medium carbon steel B. High carbon steel. C. Brass D. non-ferrous metal. E. Security F. bronze G. Duralumin.

ANSWERS:

List A	(i)	(ii)	(iii)	(iv)	(v)
List B					

SECTION B (70 Marks)

Answer **all** questions from this section

3. (a) A school storekeeper needs to buy tools and equipment for practical work. Which three measuring and checking tools would you advise him to buy for daily workshop activities?

i) .....

ii) .....

iii) .....

(b) If you were asked to add other marking-out equipment's out of the purchased tools in (a), which other seven tools would you buy to enable the process of marking to proceed?

i) .....

ii) .....

iii) .....

iv) .....

v) .....

vi) .....

vii) .....

4. (a) Fusion and non-fusion are two types of welding processes used to join metals. With two examples in each, describe these two phenomena.

i) .....

ii) .....

(b) Suppose you have finished welding the pieces of work and you want to close the workshop. Briefly explain five procedures you would follow in order to shut down a gas plant.

i) . .....

ii) .....

iii) .....

iv) .....

v) .....

5. (a) Describe the five properties of bronze materials that differentiate it with other ferrous metals

i) . . ..

ii) .....

iii) .....

iv) .....

v) .....

(b) Give five applcations of non-ferrois metals and their alloys

i) . . . .

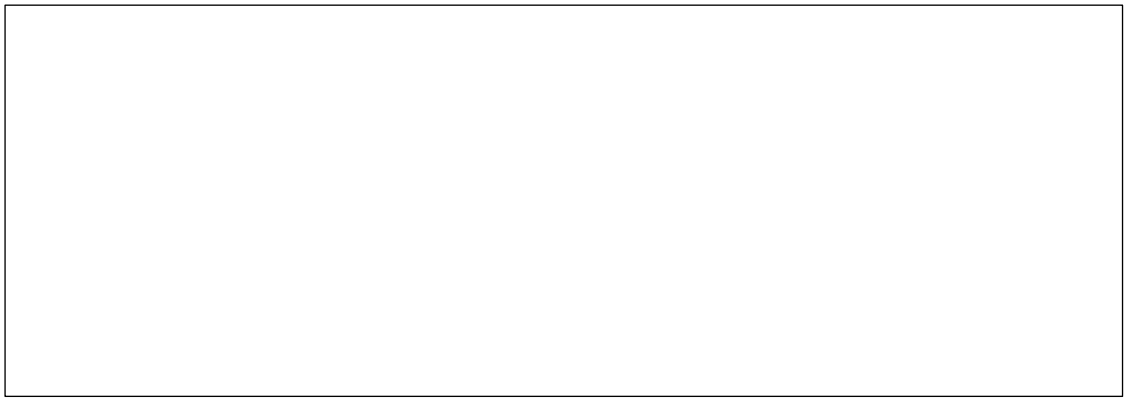
ii) .....

iii) .....

iv) .....

v) .....

6. (a) Twist drill bit and reamer are the cutting tools used in machine shop having similar shape but differs in few aspects. Draw a neat sketch of twist drill bit and label the following parts : tang , shank, neck, flute, and angle of cut.



(b) What are the two criteria whic make the drill bit differ to reamer as stated in (a):

i) .....

ii) .....

(c) Reamer and drillbits, both of them have flutes what are three functions of this part?

i) .....

ii) .....

iii) .....

7. Accidents are bad luck events which injury to the people, damage machines, tools and equipments resulting into loss of productions. What are the five causes and prevention of accidents?

(a) Causes

i) . . . . .

ii) .....

iii) .....

iv) .....

v) .....

(b) Preventions

i) . . . . .

ii) .....

iii) .....

iv) .....

v) .....

8. (a) How can you differentiate metala sna non-metals as engineering materials is concerned? Give two points

i) .....

ii) .....

(b) Steel and cast iron are both ferrous metals. What is the difference between them?

iii) Steel

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iv) Cast iron

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(c) Briefly explain the differences of the following impurities when added in the mild steel:

v) Sulphur

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vi) Manganese

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vii) Phosphorous

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9. A certain manufacturing company from abroad need to invest in Tanzania. A top manager requested you to make presentation on categories of engineers and other technical experts required for the project and their job descriptions.

(a) Give two categories of engineers and five main activities of each.

i) Category 1

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Main activities

- .....
- .....
- .....
- .....
- .....
- .....

ii) Category 2

.....

Main activities

- .....
- .....
- .....
- .....
- .....
- .....

(c) what other three technical expertise needed and their roles out of the one mentioned in (a)?

iii) Expert 1

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Role function

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.....

iv) Expert 2

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Role function

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SECTION C (15 Marks)

Answer **all** questions

10. Electrode manufactures usually provide some information with code number whicha dentifies type of electrode and main features:

a) Brielfy descibe two types of electrode based on melting point and their application

(i) .....

(ii) .....

b) Give five informations which are found on the elctrode package (box)

(i) .....

(ii) .....

(iii) .....

(iv) .....

(v) .....

c) What is meant if electrode is marked with code number **E6013** according ro to American Welding Society (AWS).

(i) **E** repreents

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(ii) **60** represents

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(iii) **1** represents

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(iv) **3** represents

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