

Candidate's Examination Number.....

SMZ

ZANZIBAR EXAMINATIONS COUNCIL

FORM THREE ENTRANCE EXAMINATION

052

MECHANICAL ENGINEERING

TIME: 2:30 HOURS

MONDAY 08TH NOVEMBER, 2021 P.M

INSTRUCTIONS TO CANDIDATES

2. This paper consists of THREE (3) sections A, B and C.
2. Answer ALL questions in section A, B and C.
3. ALL answers must be written in the space provided.
4. ALL working must be written in blue or black ink and diagrams must be in pencil.
5. Write your examination number on every page of this booklet.
6. Calculators, cellular phones and unauthorized materials are not allowed in the examination room.

	FOR EXAMINER'S USE ONLY				
QUESTION NUMBER	MARKS	SIGNATURE	QUESTION NUMBER	MARKS	SIGNATURE
1			6		
2			7		
3			8		
4			9		
5			10		
TOTAL					

This paper consists of 12 printed pages

SECTION A: (15 Marks)

Answer ALL questions from this section.

1. Choose the correct answer and write its letter below the item number in the given table
- i) Which one of the following metals is the heaviest known metal?
A. Aluminium B. Cast iron C. Copper D. Lead E. Steel
 - ii) The color of the pure copper is
A. Bluish grey B. Black
C. Redish brown D. Silvery white E. Yellow
 - iii) In which of the following categories metals are grouped in engineering?
A. Extracted and manufactured B. Ferrous and non ferrous
C. Ferrous and extracted D. Metals and non metals E. Natural and artificial
 - iv) Ability of a material to resist stretching is called
A. Hardness B. Ductility C. Malleability D. Plasticity E. Toughness
 - v) The main products from pig iron are
A. Bars, rods, wire B. Cast iron, steel, wrought iron
C. Iron ore and coke D. Malleable iron, copper E. Tools, hammer, scribers
 - vi) The end product when carbon steel is alloyed with chromium is termed as
A. B. High carbon steel B. Impure steel
C. Pure steel D. Stain less steel E. Silver steel
 - vii) What do we use for manipulating tools metals?
A. Gloves B. Hammer C. Pliers D. Tongs E. Vice
 - viii) As the carbon content increases in steel, the steel becomes
A. Elastic B. Hard and brittle C. Malleable D. Soft and ductile E. Tough
 - ix) The flame temperature for the acetylene gas is
A. 2500⁰C B. 1700⁰C C. 4000⁰C D. 3100⁰C E. 2450⁰C

x) The left hand technique in welding means

- A. Joining from right towards left
- B. Joining from left towards right
- C. Keep machine leftward
- D. Welding across left hand
- E. Welding using left-hand

Answers

i	ii	iii	iv	v	vi	vii	viii	ix	x

2. Match the items in **Column A** with the responses in **Column B** by writing its letter below the items number in a given table.

COLUMN A	COLUMN B
i. Brittle ii. Wrought iron iii. Blowpipe iv. Weld bed v. Goggles	A. A metal added during welding B. Used to remove dirty and ashes C. Ability of a metal to break easily D. Used to protect eye when machining E. Produced from paddling furnace F. Mixes and controls flow of gases G. Used to make vice bodies

Answers

i	ii	iii	iv	v

SECTION B: (70 Marks)

Answer ALL questions from this section.

3. a) As a mechanical engineering expert, explain briefly how non metals can be classified.

- b) For each of the class of non metal explained above, list down three (3) examples.

- c) One of the students in your class does not understand the typical applications of non metals, give six (6) applications of non metals.

4. a) You are given the following engineering materials properties,
i) Toughness ii) Machnability iii) Brittleness iv) Elasticity

Write the definition of each property.

5. a) Briefly describe the main types of iron ore used in the production of pig iron.

- b) Identify any four (4) methods that are commonly used in the production of steel.

- c) Explain the purpose of using oxygen in the production of steel.

6. Make a comparison between AC and DC in welding. (Use 10 items)

7. a) Give the differences between following welding terminologies.

i) Consumable electrode and Non consumable electrode

ii) Bare electrode and coated electrode

b) Identify any two (2) advantages of using radial drilling machine.

8. Make sketches for the following thread forms

- | | | |
|----------------|-----------------|-----------------|
| i) V-form | ii) Square form | |
| iii) Acme form | iv) knikle form | v) Butress form |

9. Engineering materials are useful and can be used in construction of various tools and equipments. Apply your knowledge of mechanical engineering to mention the suitable materials for the following.

- | | | |
|------------------|-----------------|---------------------|
| i) Drill bit | ii) Vice bodies | iii) Anchor chain |
| iv) Machine base | v) Lathe tools | vi) Condenser tubes |

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vii) Bolts

viii) Crane hooks

ix) Surface plates

x) Lathe chuck

[illegible]

SECTION C: (15 Marks)

Answer only ONE (1) question from this section.

10. a) Steel is widely used in constructions of different equipments and tools. Give two (2) reasons.

- b) Briefly explain the importance of alloying steel.

c) Explain the effects of the following to steel.

i) Chromium

ii) Carbon

iii) Manganese

[illegible]

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