Candidate's Examination Number.....

SMZ

ZANZIBAR EXAMINATIONS COUNCIL

FORM THREE ENTRANCE EXAMINATION

053 ELECTRICAL ENGINEERING SCIENCE

TIME 2:30 HOURS MONDAY 09TH DECEMBER, 2019 A.M

INSTRUCTIONS TO CANDIDATES

1. **This paper consists of THREE (3) sections A, B and C.**
2. **Answer ALL questions in this paper.**
3. **ALL answers must be written in the spaces provided.**
4. **Write your examination number on every page.**
5. **Calculators and cellular phones are not allowed in the examination room.**
6. **Use blue or black pen in writing, drawing must be in pencil.**

FOR EXAMINER'S USE ONLY					
QUESTION NUMBER	**MARKS**	**SIGNATURE**	**QUESTION NUMBER**	**MARKS**	**SIGNATURE**
1			**8**		
2			**9**		
3			**10**		
4			**11**		
5			**12**		
6			**13**		
7					
TOTAL					

This paper consists of 13 printed pages

Candidate's Examination Number.....

SECTION A :(10 Marks)
Answer ALL questions in this section.

1. For each of the items (i) – (x), choose the correct answer and write its letter in the table below.

i) Which of the following is a semiconductor material?

A: phosphorous B: rubber C: Silicon D: Aluminium

ii) One of the following materials is used to make coil for standard resistors

A: Copper B: Nichrome C: Platinum D: Manganin

iii) Two resistors are said to be in series when

A: Same current pass in turn through both resistors

B: Both carries the same value of current

C: Total current equals the sum of branches currents

D: Sum of IR drop equals the applied e.m.f

iv) Varistors are

A: Insulators B: Non linear resistor

C: Carbon resistor D: Resistors with zero temperature

v) The rating of fuse is always rated in

A: Ampere-hours B: Ampere-volts C: KWh D: Amperes

vi) The filament of an electric bulb is made of

A: Carbon B: Aluminium

C: Tungsten D: Nickel

vii) A 3Ohm resistor having a current of 2A will dissipate a power of

A: 2Watts B: 4Watts C: 6Watts D: 8W

viii) If a wire conductor of 0.2Ω is doubled in length its resistance will be

A: 0.4Ω B0.6Ω C: 0.8Ω D: 1.0Ω

ix) A closed switch has resistance of

A: Zero B: About 50Ω C: About 500Ω D: infinity

x) Heat in a conductor is produced on the passage of electric current due to

A: reactance B: Capacitance C: Impedance D: resistance

i	ii	iii	iv	v	vi	vii	viii	ix	x

SECTION C: (45 Marks)

Attempt ALL questions in this section

2. Draw the symbols of the following

i) Potentiometer ii) Galvanometer

3. Sate the unit of the following quantities

   i) Inductance ii) Electric Charge iii) Magnetic flux density

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4. Write down three (3) properties of a magnet.

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5. Calculate:

   i. The current taken by an electric fire having a resistance of $0.04K\Omega$, if it is connected to a 200V supply.

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   ii. The resistance of the circuit if a current of 2 Amperes flowing through the circuit when a voltage of 240V is applied.

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6. Determine the resistance of 120m long of copper wire having diameter of 12mm if the resistivity of copper is $1.7X10^{-8}$ Ωm

7. Define the following terms

   i) Magnetic force ii) Neutral point

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8. a) Give the meaning of **electrolyte** as used in lead acid cell.

   b) Name any two (2) active materials of the lead acid cell.

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9. Write short explanation on three (3) methods of heat transfer.

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10. Identify three (3) advantages of moving coil instruments

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b) State the instrument used to measure the correct mixture of a secondary cell or lead acid cells.

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SECTION C: (45 Marks)

Attempt ALL questions in this section.

11. a) A PVC twin copper cable 50m long has a total voltage drop of 8V when carrying a current of 40A. Determine the cross - sectional area of the cable and the power lost in the cable when the current is flowing. Assume that the resistivity of copper is 1.7μΩcm.

b) The field coil of a motor has a resistance of 200Ω at 20^0C. Find the resistance of a coil when the motor temperature increases to 40^oC . Temperature coefficient of a conductor is 0.004Ω /Ω degree Centigrade

12 a) An electric machine connected to a 200V supply take a current of 5A. Find

i) The input power to the machine.
ii) The energy taken from the source in 3minutes.

b) i) Define the term resistivity.

ii) Explain four (4) factors that determine the resistance of a conducting material.

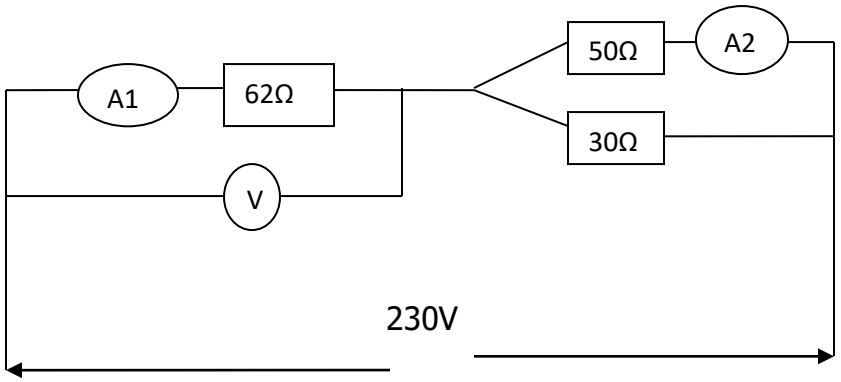
iii) A certain wire has a length of 100m and a diameter of 1.6 mm. What is the resistance of the wire having a resistivity of 0.017$\mu\Omega$m?

13. a) Distinguish between fixed capacitor and variable capacitor.

b) Capacitors of 3μF and 5μF are connected in series to a 240V dc source. Determine

i) Equivalent capacitance ii) Charge on each capacitor

c) Study the figure bellow



From the circuit above, determine

i) The reading on the voltmeter V and each of the ammeters A1 and A2.

ii) The power in the 30Ω coil

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