Candidate's Examination Number.....

SMZ

ZANZIBAR EXAMINATIONS COUNCIL

FORM THREE ENTRANCE EXAMINATION

053 ELECTRICAL ENGINEERING SCIENCE

TIME 2:30 HOURS FRIDAY 1ST DECEMBER, 2017am

INSTRUCTIONS TO CANDIDATES

1. **This paper consists of sections A, B and C.**
2. **Answer ALL questions in sections A and B and any three (3) questions from section C.**
3. **All answers must be written in the space provided.**
4. **Write your examination number on every page of this booklet.**
5. **Calculators and cellular phones are not allowed in the examination room.**
6. **Use a blue or black pen in writing. The diagrams must be drawn in a pencil.**

FOR EXAMINER'S USE ONLY					
QUESTION NUMBER	MARKS	SIGNATURE	QUESTION NUMBER	MARKS	SIGNATURE
1			9		
2			10		
3			11		
4			12		
5			13		
6			14		
7			15		
8					
TOTAL					

This paper consists of 15 printed pages.

Candidate's Examination Number……

SECTION A: (10 marks)

Answer all question in this section

1. Choose the letter of the correct answer and write it below the item number in the table below.

i) A parallel circuit consists of two resistors each having a resistance of 5Ω. The effective resistance of the circuit is

A. 2.5Ω B. 2.4Ω C. 3Ω D. 5Ω

ii) The force acts at distance causing attraction or repulsion due to magnetic field is referred to as

A. Magnet B. Magnetic field
C. Magnetism D. Ferro-magnet

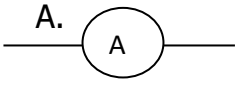
iii) Which of the following is not a form of energy?

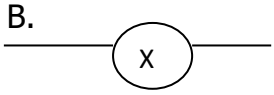
A. Heat B. Weight C. Light D. Sound

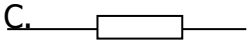
v) The value of 172K in Celsius scale is

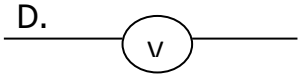
A. 101^0c B. -445^0C C. 445^0 C D. -110^0C

v) Which of the following symbols represent the instrument used to measure potential difference?

A. 

B. 

C. 

D. 

vi) The rate at which energy is dissipated is known as

A. Electrical Power
B. Electrical energy.
C. Mechanical energy.
D. Electromotive force.

vii) A wire of length 9m and radius of 0.05cm has a resistance of 5 Ω. The resistivity of the wire is

A. $4.34X10^{-7}\ \Omega m$
B. $10.5X10^{-7}$ Ωm.
C. $4.36X10^{-7}\ \Omega m$
D. $20.5X10^{-4}\ \Omega m$

viii) The boiling point of water is

A. 100^0C
B. $150\ ^0$C .
C. 200^0C
D. 250^0C.

ix) A current of $6mA$ flows through a radio resistor of $2K\ \Omega$. The p.d is

A. $6V$ B. $24V$. C. $12V$. D. $0.6V$.

x) Materials which cannot be classified as either conductor or insulator

A. Conductor
B. Insulator
C. Protons
D Semiconductor.

ANSWERS

Item number	i	ii	iii	iv	v	vi	vii	viii	ix	x

Candidate's Examination Number.....

SECTION B: (30 Marks)
Answer ALL questions from this section.

2 Define the following terms:

i) Potential difference (p.d)

_____

_____

_____

_____

ii) Electromotive force (E.m.f)

_____

_____

_____

_____

_____

3. a) Under what condition(s) does an electric shock occurs?

_____

_____

_____

_____

_____

b) Briefly explain the effects caused by electric shock.

_____

_____

_____

_____

_____

4. a) Define capacitor.

_____

_____

_____

_____

b) Name any two (2) examples of dielectric materials.

_____

_____

_____

5. List down any four (4) precautions that should be taken to avoid electrical accidents in a workshop.

_____

_____

_____

_____

_____

6. A voltage drop of $120V$ is measured across a resistor of $60\ \Omega$. Calculate the

i) Current flowing

_____

_____

_____

_____

ii) Charge in 2 seconds.

_____

_____

_____

7 . a) Define the term magnetic field.

_____

_____

_____

b) Draw a diagram that shows the magnetic poles.

8. a) Define a cell.

_____

_____

_____

b) Distinguish between a primary cell and secondary cell.

_____

_____

_____

_____

9. Write down the units for each of following quantities,

i) Magnetic flux.

_____

ii) Magnetic flux density.

_____

iii) Inductance.

_____

10. a) State ohm's law.

_____

_____

_____

_____

b) Determine the current flowing through a filament lamp rated 240V, 40W.

_____

_____

_____

11. a) Define specific heat capacity of a substance

_____

_____

_____

_____

b) Convert 33^0C in to K

_____

_____

_____

_____

Candidate's Examination Number.....

SECTION C: (60 Marks)

Answer any three (3) questions.

12: a) What do you understand by resistivity of a conductor?

_____

_____

_____

_____

b) A current was sent through a wire having resistance of 10Ω which is fully immersed in 2kg of water. At the end of 15 minutes, the rise in temperature was observed to be 60^0C.Determine the value of current.

Assuming that:

Specific heat capacity of water =4200K/kg^{0}C

Heating efficiency = 90%.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

13. a) Give two (2) advantages of an alkaline cell over lead acid cell.

b) A battery of 9 primary cells are connected in the following arrangements,

i) in series (ii) in parallel.

Each cell has an e.m.f of $1.4V$ and internal resistance of $0.45\ \Omega$. The battery terminals are connected to a resistance of $7.2\ \Omega$. In each of the two arrangements above, determine:

i) the current flowing through $7.2\ \Omega$.

ii) the voltage drop across the $7.2\ \Omega$ resistor.

14. a) List down four(4) properties of magnet.

b) Distinguish between magnetic flux density and magnetic flux.

c) A circular magnetic field has a diameter of 20cm and magnetic flux of $149.6mWb$. Determine the force exerted on a conductor 21cm long which is lying perpendicular to the field if $15A$ is flow through it.

15. a) Convert

i) $2KWh$ in to Mega Joules

ii) 90^0C to degree Fahrenheit.

iii) 212^0F in to degree Celsius

_____

_____

_____

_____

_____

_____

_____

b) Determine the efficiency of a water heater which heats $140\ litres$ of water from 10^0C to 60^0C in 3hours.The water is heated by a $3KW$ element.

Assuming that,

1 litre of water is equivalent to 1kilogram,

Specific heat capacity of water is $4180J/kg^0$C

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Candidate's Examination Number.....

Candidate's Examination Number.....