

**Candidate's Examination Number.....**

**SMZ**

**ZANZIBAR EXAMINATIONS COUNCIL**

**FORM THREE ENTRANCE EXAMINATION**

**051**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**TIME: 2:30 HOURS**

**MONDAY 08<sup>TH</sup> NOVEMBER, 2021 P.M**

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**INSTRUCTIONS TO CANDIDATES**

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

<b>FOR EXAMINER'S USE ONLY</b>					
<b>Question number</b>	<b>Marks</b>	<b>Signature</b>	<b>Question number</b>	<b>Marks</b>	<b>Signature</b>
<b>1</b>			<b>6</b>		
<b>2</b>			<b>7</b>		
<b>3</b>			<b>8</b>		
<b>4</b>			<b>9</b>		
<b>5</b>			<b>10</b>		
<b>TOTAL</b>					

**This paper consists of 12 printed pages**

**SECTION A: (15 Marks)**

**Attempt ALL questions from this section.**

1. Choose the correct answer and write its letter below the item number in the given table.
  - i) The materials in which conduction and valence bands overlap are known as:  
A. Conductors                      B. Insulators  
C. Non-metals                      D. Semiconductors
  - ii) Without diode rectification is not possible because  
A. Automatic it converts AC to DC                      B. It can store energy in electric field  
C. It conduct the high voltage                      D. It conduct only in one direction
  - iii) When working in electronic workshop  
A. Always use rubber sole shoes                      B. Always use iron chair and table  
C. Always wear loose or wet clothes                      D. Always run faster
  - iv) An instrument that detects the passage of electric current in a circuit is  
A. Voltmeter      B. Ammeter      C. Wattmeter      D. Galvanometer
  - v) A path along which an electric current is flowing  
A. Circuit      B. Loop      C. Network      D. Relay
  - vi) For which of the following "Ampere second" could be the second?  
A. Reluctance      B. Charge      C. Power      D. Energy
  - vii) The correct sequential order arrangement for d.c voltage  
A. Filter, transformer, rectifier, regulator  
B. Rectifier, transformer, filter, regulator  
C. Transformer, Rectifier, filter, regulator  
D. Transformer, rectifier, regulator, filter
  - viii) Which group among the following is an insulator?  
A. Glass, Copper, Paper                      B. Human body, wood, iron  
C. Paper, Glass, Cotton                      D. Silver, Copper and gold

ix) If the charge flowing in a certain element is 7.5C for 0.5min, what is the current in this element?

- A. 0.25A                      B. 0.25mA                      C. 25mA                      D. 2.5A


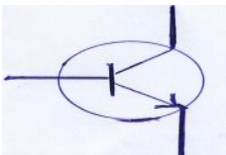


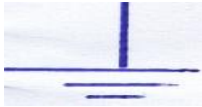
x) The unit for power is

- A. Henry                      B. Joules                      C. Watt hour                      D . Watt

**Answers**

i	ii	iii	iv	v	Vi	vii	viii	ix	x

2. Match the symbol in column A with the name of the symbol in column B by writing the letter of the correct name below the item number in a given table.

COLUMN A		COLUMN B	
i)		A. Resistor	
ii)		B. Capacitor	
iii)		C. Transistor	
iv)		D. Cell	
v)		E. Earthing	
		F. Semiconductor diode	
		G. Inductor	

**Answers**

i	ii	iii	iv	v

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**SECTION B: (70 Marks)**

**Attempt ALL questions from this section.**

- 3: As an electronics technician briefly explain any five (5) safety precautions to be considered in an electronics and communication engineering workshop.

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- 4: a) Ohm's law states the basic relationship between electric current and potential difference in an electric circuit.

i) State Ohms law

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ii) Give the unit of each quantity related in an Ohm's law.

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- b) You were given three resistors, R1, R2 and R3. Show how you will connect them in
- i) Series
  - ii) In parallel
  - iii) Series- parallel

5. a) Define the following terms

i) Electronics

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ii) Communication

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iii) Technology

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iv) Science

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6. A transformer is an electrical device, which by principle of electromagnetic induction transfers electrical energy from one circuit to the other, apply your knowledge of electronics to

a) i) Draw a symbol of transformer

ii) Mention any three (3) applications of transformer.

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- b) A transformer primary winding is connected to 240 V at 200mA. If the secondary current is 3A, find the secondary voltage.

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7. a) Write short explanation on the term **rectifier**.

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- b) Use diode and other electronics components to construct a half wave rectifier.

c) List down any five (5) disadvantages of half wave rectifier.

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8. a) Define the term "doping".

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b) Give two (2) examples of

i) Pentavalent elements

ii) Trivalent element

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c) Identify the majority and minority carriers in a

i) p-type semiconductor

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ii) n- type semiconductor

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d) State the effects of temperature on semiconductor.

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9. a) Draw the symbols of the following devices

i) NPN Transistor

ii) PNP transistor

b) Briefly explain how transistor operates as a switch.

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- c) Draw a circuit diagram showing a transistor connected as a switch.

**SECTION C: (15 Marks)**

**Answer only ONE (1) question from this section.**

10. a) i) A resistor in a faulty radio receiver was found to have color bands in this order: Brown, Green, Red and Violet . Use color code method to determine the resistance value of the resistor.

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- ii) If the colors on a 5 band resistor are in this order:  
brown, green, red, blue and violet .What is the resistance of the resistor?

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- b) You have been given three  $10\Omega$  resistors. Draw circuit diagrams to show how you would connect resistors in a circuit to obtain the following total resistance,

i)  $5\ \Omega$

ii)  $15\ \Omega$

iii)  $3.3\ \Omega$

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