Candidate's Examination Number.....

**SMZ**

**ZANZIBAR EXAMINATIONS COUNCIL**

**FORM THREE ENTRANCE EXAMINATION**

**051 RADIO AND TV SERVICING**

**TIME: 2:30 HOURS SUNDAY 27TH DCEMBER 2020 P.M**

## INSTRUCTIONS TO CANDIDATES

1. This paper consists of THREE (3) sections A, B and C.
2. Answer ALL questions in section A, B and C.
3. Write your examination number on every page of this booklet.
4. Write all answers in the space provided.
5. Use a blue or black pen in writing. Diagrams must be in pencil.
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 | | | 8 | | |
| 2 | | | 9 | | |
| 3 | | | 10 | | |
| 4 | | | 11 | | |
| 5 | | | 12 | | |
| 6 | | | 13 | | |
| 7 | | | | | |
| **TOTAL** | | | | | |

This paper consists of 12 printed pages

Candidate's Examination Number……

## SECTION A: (10 Marks)

**Attempt ALL questions from this section.**

1. Choose the correct answer and write its letter in the table provided below.

   i. Which of one emits light only when conducting current?

   A. Photo diode
   B. Zener diode
   C. Rectifier diode
   D. LED

   ii. What would happen if a pure silicon crystal at room temperature drives heat energy from the surrounding air causing some valence electrons to gain sufficient energy to jump the gap from the valence band into the conduction band?

   A. Hole
   B. Free electron
   C. Energy band
   D. Impure silicon

   iii. A fixed voltage in electronics that sets the operations conditions for a semiconductor devices, normally refers as

   A. Forward connection
   B. Reversed connection
   C. Bias
   D. Depletion

   iv. The characteristic of a pn junction diode that permit current to flow when forward-biased and prevents current flowing when reversed-biased is extremely useful in the conversion of

   A. a DC voltage to an AC voltage
   B. an AC voltage to a DC voltage
   C. an AC current to a DC current
   D. a DC current to an AC current

v. The voltage across the forward- biased diode remains approximately equal to the

A. Barrier potential
B. Break down
C. Avalanche effect
D. Reverse leakage current

vi. The difference between full-wave and half wave rectification is

A. Half wave rectifier allows unidirectional current to the load during the entire input
B. Full-wave rectifier allows unidirectional current to the load during the entire input
C. The average value for a half wave rectifier is twice
D. The result of full wave rectifier is an AC voltage that is pulsates every half cycle of the input

vii. What is the total resistance with the reference to the variable resisitors?

A. Is the smallest incremental resistance change that is possible to the potentiometer
B. Is the deviation of the output
C. Is the variation of the total resistance of the potentiometer as a functional of temperature
D. Is the resistance measured between the end terminals of the potentiometer

viii. The colour band on the extreme right in general proposed fixed resistors represents

A. First significant digit
B. Tolerance
C. Last band
D. Voltage rating

ix. Which of the following components offer a fixed value of inductance when connected in an electrical circuit?

A. Preset inductor
B. Variable inductance
C. Chokes
D. Fixed inductor

x. Which one of the following is a magnetic material for making transformers?

A. Ferrites
B. Powdered iron cores
B. Iron cores
D. Permalloy cores

**SECTION B: (45 Marks)**

**Attempt ALL questions from this section.**

2. a) A transformer primary winding is connected to 240V at 200mA, secondary gives a 3A. Find the secondary voltage.

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b) Sketch the input waveform for a full wave rectifier circuit.

3. Convert the following

i) 20MΩ in to Ω

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ii) 0.3mA in to A

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iii) 3 GHZ in HZ

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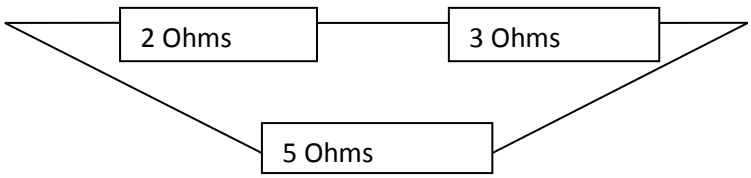
4. a)




From the figure above, determine the equivalent circuit resistance.

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b) Calculate the energy dissipated in a 10Ω resistor when a current of 2A flows for 25s.

5. a) Define the term accident.

b) List down any three (3) workshop safety rules.

6. a) What is meant by a filter?

b) List down any four (4) types of filter.

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c) Why do you think it is necessary for a capacitor to be connected in parallel with the load resistor in the circuit?

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7. a) What is the varactor diode?

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b) State the main application of varactor diode.

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c) Draw the symbol of the following

i) Tunnel diode

ii) LED

iii) Inductor

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

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9. a) Sate the quantities measured by the following measuring instruments

i) Wattmeter ii) Ohmmeter iii) Voltmeter

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b) Briefly explain the meaning of passive circuit component.

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10. a) Define the term" pn junction".

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b) What is the potential barrier for p - n junction?

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c) Differentiate between extrinsic and intrinsic semiconductors.

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**SECTION C**: **(45 Marks)**

**Attempt ALL questions from this section.**

11. a) i) What do you understand by the term transformer?

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ii) Give two (2) differences between step up transformer and step down transformer.

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b) Classify transformer on the nature of the functions performed.

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c) Briefly explain how we can reduce eddy current losses.

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12. a) Describe three (3) primary uses of capacitors in electronics circuit?

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b) List down three (3) disadvantages of electrolytic capacitors which cannot be ignored.

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c) Calculate the following:

i) The charge stored on each and

ii) The total energy stored. If 4μF, 5μF are connected in parallel and charged to 20V.

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13. Write short explanation on the following terms,

i) Valence electrons

ii) Free electrons

iii) Doping

iv) Zener break down

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