Candidate's Examination Number.....

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
FORM TWO NATIONAL ASSESSMENT

080 ELECTRICAL ENGINEERING

Time: 2:30 Hours **Tuesday, 22nd November 2016 a.m.**

Instructions

1. This paper consists of sections A and B.
2. Answer **all** questions in section A. In section B answer **all** questions in the area of your specialization.
3. **All** answers must be written in the spaces provided.
4. **All** writing must be in blue or black ink **except** drawings which must be in pencil.
5. **All** communication devices and calculators are **not** allowed in the examination room.
6. Write your **Examination Number** at the top right corner of every page.

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QUESTION NUMBER	SCORE	EXAMINERS' INITIALS
1		
2		
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4		
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8		
TOTAL		

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SECTION A

ELECTRICAL ENGINEERING SCIENCE (50 Marks)

Answer **all** questions in this section.

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

(i) What is the equivalent capacitance of 6 μF, and 3 μF capacitors connected in series?

A 2 μF
B 3 μF
C 9 μF
D 18 μF.

(ii) The magnetic material used in permanent magnets is

A iron.
B soft steel.
C nickel.
D hardened steel.

(iii) What is the value of temperature coefficient of a semiconductor?

A Zero
B Negative
C Positive
D Infinite.

(iv) Which of the following electrical quantities is measured in Amperes?

A Current
B Resistance
C Voltage
D Impedance.

(v) The electrons in the last orbit of an atom are called

A free electrons.
B bond electrons.
C valence electrons.
D thermionic electrons.

(vi) What will be the current in the circuit when the resistance is doubled and voltage kept constant?

A The current will be halved.
B The current will be doubled.
C The current will be the same.
D The current will be improved.

(vii) The purpose of load in an electric circuit is

A to utilize electrical energy.
B to increase the circuit current.
C to decrease the circuit current.
D to block both a.c and d.c currents.

(viii) which of the following systems apply only Kirchhoff's current law?

A Closed loops in a network
B Electronic circuits.
C Junctions in a network
D Open loops in a circuit.

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(ix) What is the combined resistance of two equal resistors connected in parallel?

A Twice the resistance of one resistor
B Four times of the resistance of one resistor
C One half of the resistance of one resistor
D One fourth of the resistance of one resistor .

(x) What is a transformer?

A It is an a.c machine which converts electrical energy to mechanical energy.
B It is an a.c machine which converts mechanical energy into electrical energy.
C It is a machine which converts one level of voltage to another level.
D It is a machine which converts d.c power to a.c power.

2. (a) What is the SI unit of the following quantities?

(i) Current .....
(ii) Power .....
(iii) Energy .....
(iv) Charge .....
(v) Resistance .....

(b) If a current of 4 A flows through a conductor of resistance 2 Ω:

(i) What is the potential difference across the conductor?

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(ii) Calculate the heat dissipated in the conductor.

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(iii) Study the circuit given in Figure 1 and calculate the power dissipated in each resistor.

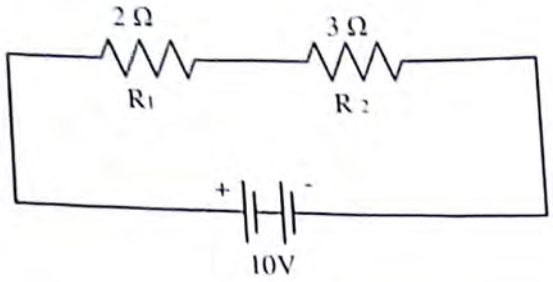


Figure 1

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(c) When two equal resistors are connected in series across a 200 V supply, the power dissipated is 40 W. Calculate;

(i) the resistance of each resistor.

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(ii) the current from the supply.

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(d) If a 12 V lamp is operated from a 240 V a.c mains step-down transformer:

(i) What will be the turns ratio of the transformer windings?

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(iii) How many turns are on the primary winding if the secondary winding has 80 turns?

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(iii) What is the current in the primary coil if the current through the lamp is 2 A?

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(e) Give five types of capacitors according to the dielectric used.

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SECTION B

ELECTRICAL INSTALLATION (50 Marks)

Answer **all** questions in this section.

3. (a) Define the following terms:

(i) Fuse element

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(ii) Fuse

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(iii) Insulator

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(iv) One-way switch.

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(b) Give standard sizes of the following cables commonly used in electrical works:

(i) Cables used for lighting circuits

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(ii) Cables for electric circuits

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(iii) Cables for ring circuits

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(iv) Cables for radial circuits.

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4. (a) Give the names of the insulators suitable for
   (i) Cooker wiring circuit cable

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   (ii) Electric iron wiring circuit cable

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   (iii) Lighting circuit cable

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   (iv) Ring circuit cable

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   (b) Mention four advantages of metal conduits.

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5. (a) List three possible electric faults that can occur in electrical circuits.

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   (b) Give the meaning of the following terms:
   (i) Electrical power.

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   (ii) Ampere.

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(iii) Electrical energy.

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(c) A piece of resistance wire 100 m long and of cross-sectional area 0.1 mm^2, at a temperature of 10 ^0C passes a current of 5 A when connected to a d.c supply at 230 V. Calculate the resistivity of the wire.

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ELECTRONICS, RADIO REPAIR AND TV SERVICING (50 Marks)

Answer **all** questions in this section.

6. (a) Name two groups of electronic components, and for each group give one example.

(i) .....

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(ii) .....

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(b) Write two types of fixed resistors.

(i).....

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(ii).....

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(c) Tabulate the values of colours used in resistors for colour coding.

Colour	Value
Red	
Green	
Blue	
Black	
Violet	
White	
Brown	
Orange	
Yellow	
Gray	

7. (a) (i) Define the term "Semiconductor material".

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(ii) Mention two common semiconductor materials.

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(iii) Name two kinds of extrinsic semiconductors.

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(b) (i) Mention three leads of a bipolar junction transistor.

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(b)

(i) If a collector current (I_C) is 30 mA and that of Emitter (I_E) is 35mA. Calculate the base current (I_B).

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(ii) The current in a collector terminal (I_C) is 19 mA and the emitter current (I_E) is 20 mA. What is the current amplification factor (α)?

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8. (a) (i) What is soldering?

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(ii) Which tool is used to remove molten solder from the PCB?

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(iii) Give two materials used to make an alloy of a solder wire.

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(b) Draw electronic symbols for:

(i) Fixed capacitor.

(ii) Variable resistor.

(c) Study Figure 2 carefully and answer the questions that follow.

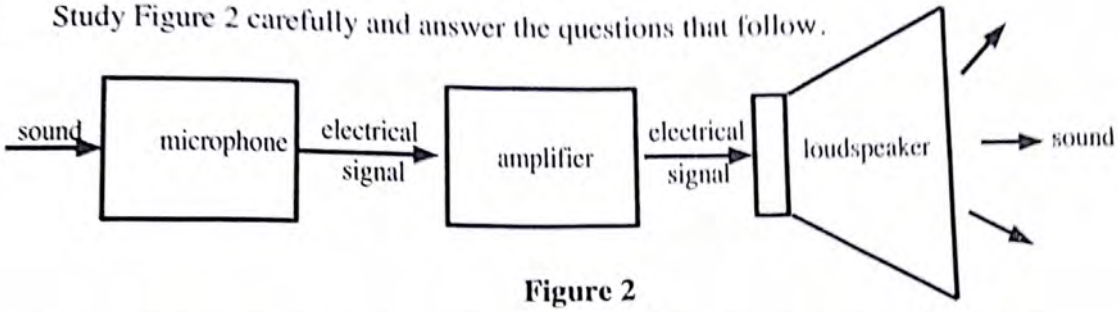


Figure 2

(i) What is the function of the following parts of the block diagram given in Figure 2?

Microphone.

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Amplifier.

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Loudspeaker.

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(ii) Name two transducers found in Figure 2.

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