Student's Assessment Number.....

THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

FORM TWO NATIONAL ASSESSMENT

080 ELECTRICAL ENGINEERING

Time: 2:30 Hours **Year: 2023**

Instructions

1. This paper consists of sections **A, B** and **C** with a total of **ten (10)** questions**.**
2. Answer **all** questions.
3. Section **A** and **C** carry **fifteen (15)** marks each and section **B** carries **seventy (70)** marks.
4. Cellular phones and any unathorized materials are **not** allowed in the assessmenmt room.
5. Write your **Assessment Number** at the top right hand corner of every page.

FOR ASSESSOR'S USE ONLY		
QUESTION NUMBER	**SCORE**	**ASSESSOR'S INITIALS**
1		
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10		
TOTAL		
CHECKER'S INITIALS		

Student's Assessment Number.....

SECTION A (15 MARKS)

Answer **all** questions in this section

1. Choose the correct answer from alternatives (A to D) by writing its letter in the box provided:

   i) A car battery has an accumulation of white paste in its terminals which is a sign that the battery undergoes sulphation. What does this phenomenon imply?

   A. Sulphur in the sulphuric acid combines with lead on the plates.

   B. Sulphur in the sulphuric acid combines with cooper on the plates.

   C. Sulphur in the sulphuric acid combines with oxygen on the plates.

   D. Sulphur in the sulphuric acid combines with zinc on the plates.

   ii) You are provided with an electric circuit which consists of two resistors with different values connected in series. What will be the behavior of the circuit?

   A. The voltage across each resistor will be the same

   B. The same value of current will pass through each resistor.

   C. There will be same current division for each resistor.

   D. All resistors will have the same power loss.

   iii) What are the responsibilities of an electrical technician in a manufacturring company?

   A. To interpret the customers requirements.

   B. To prevent random movement of employees.

   C. To study theories, design and application of electrical equipment.

   D. To study manufactured electrical equipment and devices.

   iv) Which name is given to a triangle with two equal sides?

   A. Equilateral

   B. Isosceles

   C. Obtuse scalene

   D. Acute scalene

v) The resistance of a conductors is 0.05. What will be the current passing through it to give a voltage drop of 6V?

A. 0.3A
C. 12 A
B. 120A
D. 3 A

vi) Which electrical instrument would you use to measure voltage, current and resistance?

A. Ohmmeter
B. Voltmeter
C. Ammeter
D. Multmeter

vii) If two conductors are placed paralle to one onother and the current is applied on one side of those conductors; what happen to the conductors ?

A. Force of repulsion will occur between conductors.
B. Force of attraction will occur between conductors.
C. No force will occur between conductors.
D. Force of gain and lose to the conductors will occur.

viii) What are the three different ways of expressing electrical quantities?

A. Ampere, Ohm and Volt.
B. Ampere, Watt and Volt.
C. Ohm, Volt and Second.
D. Meter, Ampere and Volt

ix) What could be the main causes of electrical accidents in workshops?

A. Lack of protective equipment
B. Carelessness and inexperience
C. Students lack of technical skills
D. Bad rules of working area

Student's Assessment Number.....

x) You are required to remove sharp edges on a metal conduit. Which tool would you use?

A. Chisel

B. Gas Plier

C. Reamer

D. Punch

2. Match the functions of the protective equipment in **List A** with their respective protective equipment in **List B** by writting a letter of the correct response.

LIST A	**LIST B**
(i) It safeguards the head from falling objects and from bangs against obstruction. (ii) It is used to protect the eyes from injury when drilling and grinding any materials. (iii) It is applied when working close to noisy machinery or work operations. (iv) It protects hands from injury, cuts abrasions and burns. (v) It is used when working on poisonous gases and in dusty environment.	A. Gloves B. Headphone C. Goggles D. Full-face respirator E. Helmet F. Hat G. Overall H. Boot

List A	(i)	(ii)	(iii)	(iv)	(v)
List B					

***Student's Assessment Number*.....**

SECTION B (70 MARKS)

Answer **all** questions from this section

3. (a) A good indication of a fully charged lead acid cell is a colour change in both positive and negative plates.

(i) Which colour wiil be produced in each plate that will indicate if the battery is fully charged?

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(ii) Suggest four things which should be done before charging the lead acid cell to increase its life span.

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(b) Calculate the value of resistance required to give the charging current of 10 A if a battery of 12 cells is charged from a 30Vdc supply. The terminal voltage (E) per cells is 1.9V and the internal resistance being neglected.

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4. (a) Two capacitors C_1 and C_2 are connected in parallel, across a supply of 'V' volts and a charge of 'Q' coulumbs is produced. With the aid of a circuit diagram, show the equivalent capacitance given by $C = C_1 + C_2$.

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(b) Suppose you need 10 μF capacitance of a certain application and the available capacitance in store is of value 0.05 μF only, how would you make that you get the total capacitance?

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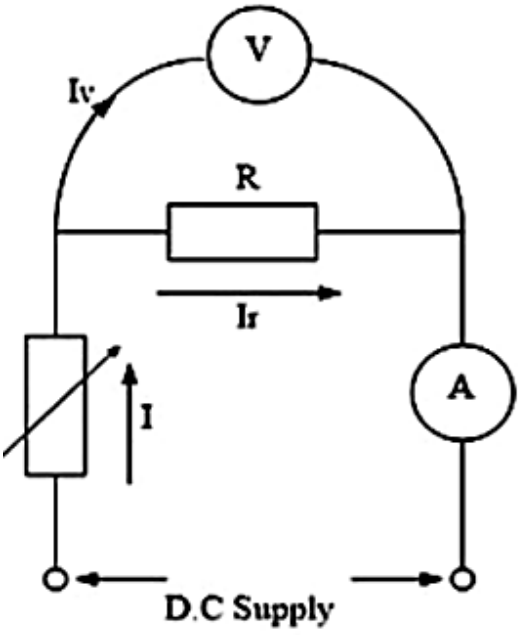
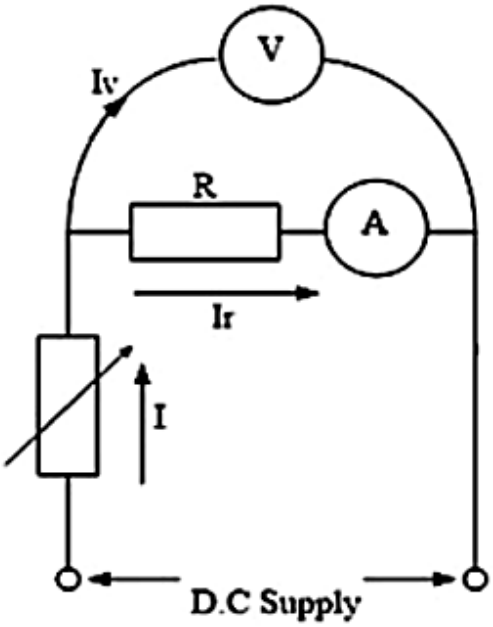
5. The resistance of the ammeters and voltmeters in diagrams (a) and (b) are 0.05 Ω and 350 Ω respectively. If the ammeter and voltmeter reading are 5A and 35V respectively, calculate the value of resistance R in diagram (a) and (b).



(a)



(b)

6. (a) Why dimensions are very important in engineering drawings?

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(b) With the aid of a diagram,describe how the following types of lines are used in a drawing:

(i) An extension line.

(ii) A dimension line

(iii) A leader

7. (a) You are in a workshop and you have been given several measuring instruments.

(i) How will you categorise the instruments as either analog or digital instruments?

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(ii) Assume some of the instruments given are the KVA meter and Clamp meter. In which circumstance would you need to use these instruments?

- KVA meter
- Clamp meter

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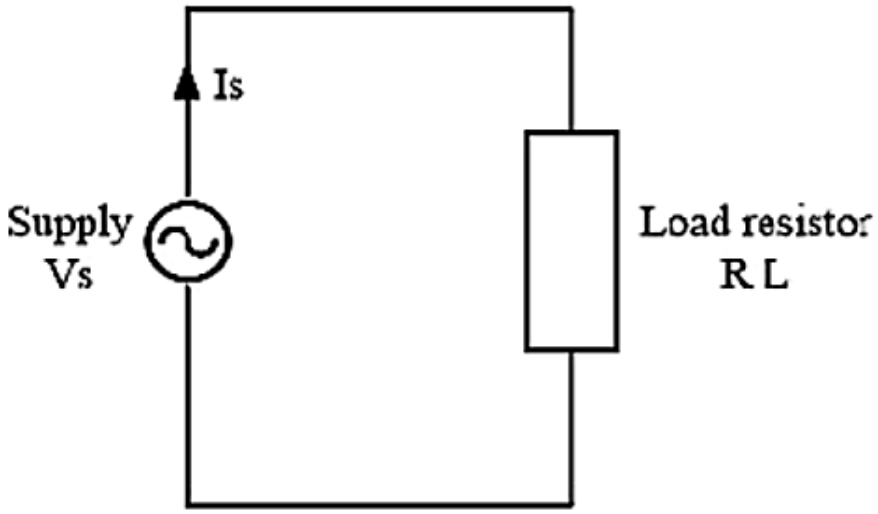
(b) Suppose you are provided with an electric circuit as shown in the figure and

you are tasked to measure the electric current (I_s) and load resistance(R_L) of the circuit.



(i) What measuring instruments will you use to accompish the assigned task?

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(ii) Redraw the circuit and show how you will position the meters to measure

the current (I_s) and load resistance (R_L) of the given circuit.

8. (a) Give two differences between magnetic and electric circuits.

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(b) A coil of 150turns is linked with a flux of 0.01*Wb* when carrying a current of 10A. If the current is uniformly reversed in 0.01seconds, calculate:

(i) Inductance of the coil.

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(ii) Induced electromotive force.

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9. (a) You have been provided with tools such as plier, pocket knife, chisel, hand drill and center punch for doing electrical lighting and writing. Why are these tools important for such work?

(i) Pliers

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(ii) Pocket knife

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(iii) Chisel

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(iv) Hand drill

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(v) Centre punch

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(b) What safety precautions youshould observe in handling each tool mentioned in (a) (i)-(v).

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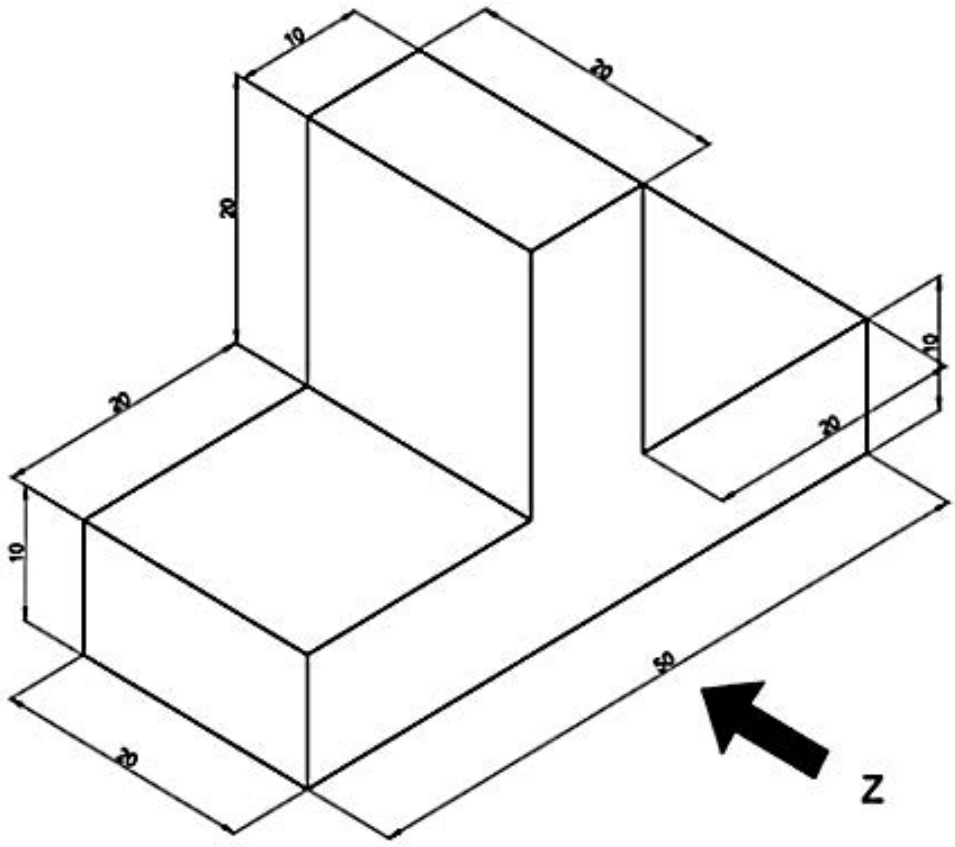
Student's Assessment Number.....

SECTION C (15 MARKS)

Answer **all** questions from this section

10. The following object is presented to you for the development. Produce the following views in full scale size by using third angle projection.
    (a) Front view in direction of Z.
    (b) End view.
    (c) Plan view.

All dimensions are in mm. Consrtuction lines must not be erased and all drawings should be neatly shown.



Student's Assessment Number.....

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