



CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)
CSSC JOINT EXAMINATIONS FOR CHURCH SCHOOLS
EASTERN ZONE

FORM II PRE – NATIONAL EXAMINATION 2024
ELECTRICAL ENGINEERING

CODE: 080

Time: 2:30 Hours

Date: Thursday, 29th August, 2024 a.m

Instructions

1. This paper consists of three sections **A**, **B** and **C**.
2. Answer **all** questions in section **A** and **B** and any three questions from section **C**.
3. Write your answers in the answer booklet(s) provided.
4. Non programmable calculators may be used
5. Cellular phones and any unauthorized materials are not allowed in the Examination room.
6. Write your **Examination Number** on the top right hand corner of every page.

FOR EXAMINER'S USE ONLY

QUESTION NUMBER	SCORE	EXAMINER'S INITIALS
1		
2		
3		
4		
5		
6		
7		
8		
9		
TOTAL		
CHECKER'S INITIALS		

SECTION A: (15 Marks)

Answer all questions in this section

1. For each of items (i) — (x), choose the correct answer from the given alternatives and write 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 copper 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 behaviour 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 manufacturing company?
- A. To interpret the customers' requirements.
B. To prevent random movement of the employees.
C. To study theories, design and application of electrical equipment.
D. To buy 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 conductor is 0.05Ω . What will be the current passing through it to give a voltage drop of 6 V?
- A. 0.3 A
B. 120 A
C. 12 A
D. 3 A
- (vi) Which electrical instrument would you use to measure voltage, current and resistance?
- A. Ohmmeter
B. Voltmeter
C. Ammeter
D. Multimeter
- (vii) If two conductors are placed parallel to one another and the current is applied on one side of those conductors; what will 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. Metre, 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
- (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

QUESTION	i	ii	iii	iv	v	vi	vii	viii	ix	x
ANSWER										

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

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

LIST A	i	ii	iii	iv	v
LIST B					

SECTION B: (70 Marks)

Answer all questions in this section

3. A good indication of a fully charged lead acid cell is colour change in both positive and negative plates. Which colours will be produced in each plate that will indicate if the battery is fully charged?

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4. Suggest four things which should be done before charging the lead acid cell so as to increase its life span.

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

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

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

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7. Suppose you are provided with an electric circuit as shown in Figure 1 and you are tasked to measure electric current (I_s) and load resistance (R_L) of the circuit.

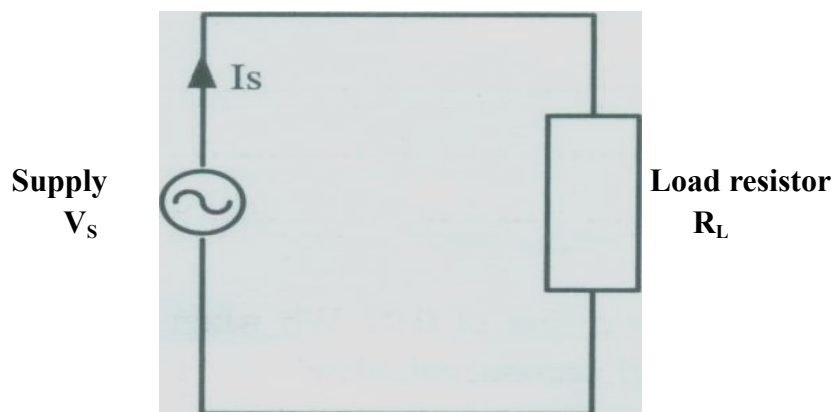
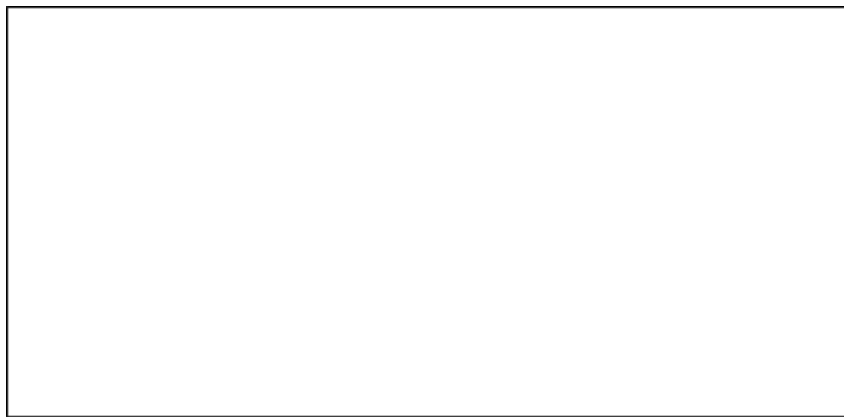


Figure1

(i) What measuring instruments will you use to accomplish 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) Define the term “Temperature” as used in electrical engineering science

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(b) (i) Convert **85°F** into degree Celsius

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(ii) Convert **90°C** into Fahrenheit

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9. Ten cells each of e.m.f of 1.5 V and internal resistance of 0.2 Ω are connected in series.

(a) Total internal resistance.

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(b) Current through the external resistance of 4 Ω

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