END TERM 3 2026

GRADE 10

ELECTRICITY

SUMMATIVE ASSESSMENT

TIME: 2 HOURS 30 MINUTES

Name:	_____
Assessment Number:	_____
Class / Stream:	_____
Date:	_____

INSTRUCTIONS TO CANDIDATES

- Write your name and assessment details in the spaces provided.
- Read all questions carefully before answering.
- Answer ALL questions.
- Show all working where calculations are required.
- Use appropriate units in calculations and standard electrical symbols in diagrams.
- Label diagrams clearly where required.
- Write answers in the spaces provided where applicable.
- Use clear and legible handwriting.
- Check that all pages and questions are present.

EXAMINER'S USE ONLY

Section	Question Numbers	Maximum Score	Candidate's Score
A	1–10	20	
B	11–15	30	
C	16–18	30	
D	19–20	20	
TOTAL		100	

SECTION A — FOUNDATIONAL STRUCTURED QUESTIONS

Answer all questions in this section.

1. State two reasons why knowledge of electrical safety is important when carrying out electrical tasks. **(2 marks)**

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2. Distinguish between a conductor and an insulator, giving one example of each. **(2 marks)**

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3. Differentiate between a primary cell and a secondary cell. **(2 marks)**

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4. State the principle on which a capacitor operates and name one application of a capacitor. **(2 marks)**

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5. Name two types of pictorial drawing used in engineering representation. **(2 marks)**

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6. State two magnetic properties of materials that are useful in electrical technology. **(2 marks)**
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7. State two factors that affect the strength of an electromagnet. **(2 marks)**
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8. What is meant by energy storage in an inductor? State one application of an inductor. **(2 marks)**
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9. Name two stages or components involved between electrical generation and distribution to consumers. **(2 marks)**
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10. State two items of equipment found at a consumer's power intake point. **(2 marks)**
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SECTION B — APPLICATION, DATA, DIAGRAMS AND PROBLEM SOLVING

Answer all questions in this section.

11. A 12 V d.c. supply is connected to two resistors of 2 Ω and 4 Ω in series. **(8 marks)**

(a) Draw the circuit represented by the description, using standard electrical symbols. **(3 marks)**

DIAGRAM / WORKING AREA

(b) Calculate the total resistance of the circuit. **(2 marks)**
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_____

(c) Calculate the current flowing through the circuit. **(2 marks)**
_____
_____
_____

(d) State the expected reading of the voltmeter. **(1 marks)**
_____

12. A learner has two 1.5 V cells and a rechargeable secondary battery available for a low-voltage electrical application. **(6 marks)**

(a) Draw the arrangement of the two 1.5 V cells when connected in series and state the combined voltage. **(3 marks)**

DIAGRAM / WORKING AREA

(b) State three precautions for the safe maintenance or charging of rechargeable batteries. **(3 marks)**

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13. Two capacitors of capacitance 2 μF and 4 μF are connected in parallel across a 12 V supply. **(6 marks)**

(a) Calculate the total capacitance of the combination. **(2 marks)**

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(b) State the voltage across each capacitor. **(1 marks)**

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(c) Explain why capacitors can be useful in electrical control circuits such as timer circuits. **(3 marks)**

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14. A rectangular block is to be represented pictorially for an engineering drawing. **(4 marks)**

(a) Produce an isometric pictorial sketch of the block shown by the supplied diagram. **(3 marks)**

DIAGRAM / WORKING AREA

(b) State one advantage of pictorial drawings in engineering design. **(1 marks)**

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15. A current-carrying conductor and a solenoid are used to demonstrate electromagnetism. **(6 marks)**

(a) Draw the magnetic field pattern around a straight current-carrying conductor and indicate its direction. **(3 marks)**

DIAGRAM / WORKING AREA

(b) State three applications of electromagnets in electrical technology. **(3 marks)**

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SECTION C — EXTENDED STRUCTURED APPLICATION

Answer all questions in this section.

16. An electrical device uses inductors in its circuit. The designer must select and connect inductors appropriately. **(10 marks)**

(a) Explain how an inductor stores energy. **(2 marks)**

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(b) Two inductors of 3 H and 6 H are connected in series. Calculate their equivalent inductance. **(3 marks)**

(c) State two characteristics of an inductor that should be considered when selecting one for a d.c. circuit. **(2 marks)**

(d) Explain one practical application of an inductor in an electrical or electronic appliance. **(3 marks)**

17. A rural area is supplied through an electrical power grid. **(10 marks)**

(a) Draw a labelled block diagram showing the main stages from generation to distribution to consumers. **(5 marks)**

DIAGRAM / WORKING AREA

(b) Explain why high-voltage transmission is used in the power grid. **(2 marks)**

(c) State three reasons why a reliable national grid is important to socio-economic development. **(3 marks)**

18. An electrician is preparing to complete an electrical installation in a domestic building. **(10 marks)**

(a) Identify four items of equipment that may be found at the consumer's intake point. **(4 marks)**

(b) State the correct sequence in which the main control/protection equipment is connected at the consumer's intake point. **(3 marks)**

(c) State three checks or considerations an electrician should make before commissioning a final circuit. **(3 marks)**

SECTION D — ELECTRONICS AND INTEGRATED PROBLEM SOLVING

Answer all questions in this section.

19. Semiconductor materials are used to construct electronic devices. **(10 marks)**

(a) Explain the difference between intrinsic and extrinsic semiconductors. **(3 marks)**

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(b) Explain how doping produces P-type and N-type semiconductor materials. **(3 marks)**

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(c) Use a labelled sketch to show the formation of a PN junction. **(2 marks)**

DIAGRAM / WORKING AREA

(d) State two reasons semiconductor materials are important in electronic engineering. **(2 marks)**

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20. A technician is testing a diode and a transistor in an electronic switching circuit. **(10 marks)**

(a) Describe the operation of a semiconductor diode under forward bias and reverse bias. **(4 marks)**

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(b) State two applications of diodes in electronic systems. **(2 marks)**

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(c) A transistor is used as a switch. Explain how changing its input condition can control current in the output circuit. **(3 marks)**

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(d) State one safety or troubleshooting precaution when testing electronic components in a circuit. **(1 marks)**

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