TEVETA

Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN AUTOMOTIVE ELECTRICAL AND ELECTRONICS

LEVEL 6 YEAR 1 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: NOVEMBER/DECEMBER 2025

SUBJECT: AUTOMOTIVE ELECTRICAL TECTNOLOGY I

TIME: THREE (3) HOURS **TOTAL MARKS: 100**

PASS MARK : 50

INSTRUCTIONS TO CANDIDATE

1. Write your examination number and the National Registration Card Number on the answer booklet provided. Ensure to append your signature in the space provided on the answer booklet.
2. Write your answer SCRIPT SERIAL NUMBER on the examination register and the entry slip provided.
3. There are EIGHT (8) questions in this question paper.
4. Answer FIVE (5) questions. Question one (1) is compulsory and choose any other four (4) questions.
5. Cell phones and programmable calculators are NOT allowed in the examination room.

DO NOT TURN THIS PAPER UNTIL YOU ARE TOLD TO DO SO

QUESTION 1 - COMPULSORY

A. A compound circuit consisting of two sets of resistors using one source of 12V, with the first pair having 3Ω and 5Ω connected in parallel and the second pair having 15 Ω and 8Ω connected in series. Furthermore, each pair has a separate switch.

(i) Sketch the circuit [3 Marks]
(ii) Evaluate total resistance [4 Marks]
(iii) Evaluate current if the switch for the first pair is closed and the second switch is open [1 Mark]
(iv) Evaluate current if the switch for the second pair is closed and the first switch is open. [1 Mark]
(v) Evaluate total wattage [2 Marks]

B. The first set of three resistors are connected in series, the second set of two resistors are connected in parallel. The two sets are connected in parallel to each other and in series to a single resistor 11 ohms. Given 12V first set consist of 3Ω, 3Ω, 5Ω. The second set consists of 5Ω, 6Ω.

(i) Sketch the circuit [3 Marks]
(ii) Total resistance [4 Marks]
(iii) Total current [1 Mark]
(iv) Total wattage [1 Mark]

TOTAL: [20 MARKS]

QUESTION 2

Magnetism is referred to as physical phenomenon produced by the motion of electric charge, which results in attraction and repulsive forces between objects.

A. Describe each of the following

(i) Full wave rectification [2 Marks]
(ii) Eddy current [2 Marks]
(iii) Hall effect [2 Marks]
(iv) Impedance [2 Marks]
(v) Three phase. [2 Marks]

A. state each of the following

(i) Domain theory of magnetism [2 Marks]
(ii) Lenz's law of magnetism [2 Marks]

B. Identify four (4) characteristics of magnetism [4 Marks]

C. Explain why secondary is said to be inversely proportional to primary turns in a transformer [2 Marks]

TOTAL: [20 MARKS]

QUESTION 3

A. Distinguish the difference between a lead acid battery and a maintenance free battery in terms of operation and construction [6 Marks]

B. If the S.G reading of an electrolyte temp at STD temp is 15 is 1. 400. Compute the equivalent S.G. at temp of 20 °C [4 Marks]

C. Identify four (4) types of EV batteries [4 Marks]

D. Describe the operation of the oxygen recirculation (MFB) during charge and discharge of a lead acid battery with an acid of a chemical formula. [6 Marks]

TOTAL: [20 MARKS]

QUESTION 4

A. State two (2) types of dynamic electricity [2 Marks]

B. sketch two (2) graphs showing the sine waves of the above types of electricity. [4 Marks]

C. Identify three (3) types of electrical materials used in automotive electrical and electronics. [6 Marks]

D. Explain four (4) factors that affect resistance in ordinary conductor. [8 Marks]

TOTAL: [20 MARKS]

QUESTION 5

A. State the instrument that is used to measure:

(i) Electron flow on a circuit [2 Marks]

(ii) Specific gravity [2 Marks]

(iii) Potential difference [2 Marks]

(iv) Opposition to current flow [2 Marks]

(v) Magnetic field [2 Marks]

B. Describe how the above instruments can be used to test the above quantities [10 Marks]

TOTAL: [20 MARKS]

QUESTION 6

A. Sketch symbols of each of the following electronic components.

(i)	Rectifier	[1 Mark]
(ii)	Light emitting diode	[1 Mark]
(iii)	Zener diode	[1 Mark]
(iv)	Voltage diver	[1 Mark]
(v)	Potentiometer	[1 Mark]
(vi)	Silicon controlled rectifier	[1 Mark]
(vii)	Light dependent resistor	[1 Mark]
(viii)	Capacitor polarized	[1 Mark]
(ix)	Amplifier	[1 Mark]
(x)	Triode thyristor	[1 Mark]

B. Interpret the following automotive number codes

(i)	59	[1 Mark]
(ii)	53	[1 Mark]
(iii)	75	[1 Mark]
(iv)	53b	[1 Mark]
(v)	51	[1 Mark]
(vi)	4	[1 Mark]
(vii)	56b	[1 Mark]
(viii)	55	[1 Mark]
(ix)	87a	[1 Mark]
(x)	49	[1 Mark]

TOTAL: [20 MARKS]

QUESTION 7

A. Explain the following terms

(i) Conventional theory	[2 Marks]
(ii) Electromagnetic induction	[2 Marks]
(iii) Electron theory	[2 Marks]
(iv) False load	[2 Marks]
(v) Static electricity	[2 Marks]

B. Define the following terms

(i) Electricity	[2 Marks]
(ii) Resistance	[2 Marks]
(iii) Induction	[2 Marks]
(iv) Ionization	[2 Marks]
(v) Dynamic electricity	[2 Marks]

TOTAL: [20 MARKS]

QUESTION 8

A. Identify three (3) basic factors of electrical flow in a circuit [3 Marks]

B. State ohms' law and show its three basic formulas [5 Marks]

C. Sketch electrical symbols of the following

(i) Circuits breaker [1 Mark]

(ii) Ground [1 Mark]

(iii) Voltmeter [1 Mark]

(iv) Alternator [1 Mark]

(v) Fuse [1 Mark]

D. Define the following

(i) Atom [1 Mark]

(ii) Magnet [1 Mark]

(iii) Current [1 Mark]

(iv) Electron [1 Mark]

(v) Circuit [1 Mark]

E. Differentiate between positively charged and negatively charged atoms. [2 Marks]

TOTAL: [20 MARKS]