



**NATIONAL VOCATIONAL TRAINING INSTITUTE
TESTING DIVISION**

TRADE TESTING REGULATIONS AND SYLLABUS

TRADE: MOTOR VEHICLE ELECTRICAL

LEVEL: CERTIFICATE TWO

CERTIFICATE TWO - MOTOR VEHICLE ELETRICAL

A. INTRODUCTION

- i. The review of this syllabus has been generally influenced by the demands of industries due to its continuous change as a result of technological advancement and the changing needs of society. It was also influenced by the TVET reforms under the directions of the new educational reform with the view to opening up further education and training opportunities to TVET graduates. The certificate TWO syllabus is designed to respond to the following level descriptors:

QUALIFICATION	KNOWLEDGE LEVEL	SKILLS AND ATTITUDE:
Certificate II	<ol style="list-style-type: none">1. To demonstrate broad knowledge base with substantial depth in area(s) of study.2. To demonstrate a command of analytical interpretation of range of data.3. To present results of study accurately and reliably.	<ol style="list-style-type: none">1. Needs varied skills and competencies in different tasks under various contexts.2. Require a wide range of technical and supervisory skills.3. Would be employed in different contexts.

- ii. The rational of this syllabus is to establish the level of knowledge and skills required by mechanics over a wide range of applications, including the development of an ability to diagnose faults, recommend means of rectifying these faults and to test and analyse the performance of the vehicle after repairs or modification has been completed.

B. THE GENERAL OBJECTIVES

On completion of this course, the trainee should be able to:

- i) understand the Basic Electrical operations essential for the repairs and maintenance of Motor Vehicle Electrical Systems
- ii) To give trainee a thorough knowledge of the Motor Vehicle Electrical Systems including their auxiliary systems emphasizing basic similarities and differences.

C. THE COURSE COMPONENTS

Trade Theory
Science and Calculation
Trade Drawing
General Paper
Trade Practical

EXAMINATION: The candidates would be examined in the FIVE components listed in 'C' above. Practical work must be carefully planned to illustrate application of the theory and to provide maximum opportunity for shop practice, laboratory work and demonstration.

D. KNOWLEDGE AND SKILLS REQUIREMENT

The prime objective of the programme is to provide knowledge and skills of the trade in a manner that will best meet the needs of the trade as well as industries using professional equipments.

E. ENTRY TO THE COURSE

Minimum education: Must have passed JHS or SHS examination/Foundation certificate. However, the selection of the students for the course is within the discretion of the head of the institution.

F. ELIGIBILITY FOR ENTRY TO EXAMINATION

Candidates may enter for examination only as internal candidate; that is those who at the time of entry to the examination are undertaking (or) have already completed the course at an approved establishment.

G. EXTERNAL EXAMINERS

The practical work of candidates will be assessed by an external examiner appointed by the Trade Testing Commissioner.

H. EXAMINATION RESULTS AND CERTIFICATES

Each candidate will receive record of performance given the grade of performance for the components Taken. These are:

- i) Distinction
- ii) Credit
- iii) Pass
- iv) Referred/Fail

Certificates would be issued to candidates who pass in all the components.

NOTE:

All Technical and Vocational trainees who aspire to take advantage of the opportunities opened to them in the educational reforms should NOTE that, for a trainee to progress to certificate Two (2) a pass in Certificate One (1) is compulsory.

I. APPROVAL OF COURSE

Institutions or other establishments intending to prepare trainees for the Examination must apply to
THE COMMISSIONER
TESTING DIVISION
NVTI, HEAD OFFICE
P.O. BOX MB 21, ACCRA

J. ACKNOWLEDGEMENT

NVTI wishes to acknowledge the preparatory material done by the team of Experts, which have been incorporated into this syllabus.

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Government's desire to improve the lot of Technical/Vocational Training, which led to the preparation of this syllabus, is hereby acknowledge.

CERTIFICATE TWO - TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUE
1.0	BATTERIES	1.1 High maintenance, Low maintenance and maintenance and free batteries.	1.2 The constructional features and its advantages	1.3 Identification of real object. Guide students to explain the difference between the batteries listed in sub-point.
2.0	NIKEL ALKALINE BATTERIES	2.1 Construction of plates, containers and electrolyte.	2.2 Principle of operation, charge and discharge of alkaline batteries.	2.3 With the aid of real object, chart simple sketches. Explain its principle of operations.
3.0	SWITCHES	3.1 Electromagnetic switches	3.2 Operational principle of the electromagnetic switches.	3.3 Identify real object, demonstrate how electromagnetic switches operates.
4.0	LIGHTING SYSTEM	4.1 Heading circuit, Taillight Circuit, room lamp circuit, side lamp circuit, etc.	4.2 Lamp circuit installation.	4.3 Using simulators and diagrams guide student to explain the purpose of the various lamp circuit in sub-point 4.1
5.0	MOTORS	5.1 Types of motors	5.2 Drive mechanism.	5.3 Using real object guide students to identify the various types of motor and their drive mechanism including the locations.
6.0	ELECTRICAL SYMBOLS	6.1 Types of electrical symbols. (Electrical schematic drawings)	6.2 Identify the electrical symbols and its representation.	6.3 With the aid of sketch and chart help students to identify electrical symbols
7.0	HORNS	7.1 Types of Horns	7.2 Constructional features of the various types of horn, their uses and advantages.	7.3 Using real object, explain the constructional differences between the various types of horn and its advantages to students.

CERTIFICATE TWO - TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUE
8.0	STARTING SYSTEM	<p>8.1.1 The starting system lay out.</p> <p>8.1.2 The main component of the starting system.</p>	<p>8.2.1 Purpose of the starting system, lay out and component.</p> <p>8.2.2 Components of the starting system</p> <ul style="list-style-type: none"> • Armature • Casing • Brushes, etc. 	<p>8.3.1 Use sketches or chart to explain the purpose of the starting system.</p> <p>8.3.2 Guide students to identify the main component of the starting system and discuss their functions.</p>
9.0	CHARGING SYSTEM	<p>9.1.1 The charging system.</p> <p>9.1.2 The lay-out of the charging system.</p> <p>9.1.3 Construction and operation of the main component and their advantages.</p>	<p>9.2.1 Lay-out the charging system;</p> <ul style="list-style-type: none"> • Alternator • Dynamo <p>9.2.2 Comparism of DC and AC generators construction and advantages of the main components.</p>	<p>9.3.1 Using simple sketches or charts to explain the purpose of the charging system.</p> <p>9.3.2 Help students to identify the components of the charging system.</p> <p>9.3.3 Guide students to compare the difference between DC and AC generators and their advantages.</p>
10.0	<p>ELECTRONIC IGNITION</p> <p>i) CONTACT CONTROL</p> <p>ii) MAGNETIC CONTROL</p>	<p>10.1.1 Transistorized ignition system.</p> <p>10.1.2</p> <ul style="list-style-type: none"> • Advantages of Electronic Ignition System • Conventional Ignition System. 	<p>10.2.1 Transistorized and electronic ignition system;</p> <ul style="list-style-type: none"> • Inductive Pulse generator • Hall generator • Optical <p>10.2.2 Advantages of electronic ignition system.</p>	<p>10.3.1 Use sketches or chart to explain the operation of the electronic ignition using the systems listed in the sub-points.</p> <p>10.3.2 Guide students to discuss the advantages of the electronic ignition system.</p>

CERTIFICATE TWO - TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUE
11.0	AUXILIARY CIRCUITS	11.1 Main components in the auxiliary circuits and their functions.	11.2 Auxiliary Units; i. Instrumental Panel ii. Wiper iii. Horn iv. Power window v. Central locking system, etc.	11.3 Guide students to identify the following auxiliary units and explain their operations and functions.
12.0	FUEL GAUGES	12.1 Types of fuel gauges and its functions.	12.2.1 Main components and its functions in the fuel gauges. 12.2.2 Purpose of fuel gauge.	12.3.1 Discuss the various types of fuel gauges and its main components with students. 12.3.2 Assist students to discuss the purpose of fuel gauges.
13.0	COMPONENT OF THE AIR CONDITIONER	13.1.1 Purpose of vehicle Air-condition system. 13.1.2 Principle of operation of vehicle Air-condition system.	13.2.1 Lay out and identification of major component. 13.2.2 Functions of the major component.	13.3 Use sketches or charts to explain the purpose of the air-condition system and discuss its operation with students.
14.0	FUNDERMENTALS OF ELECTRONICS	14.1 Auto Electronics	14.2.1 Electronic component. • Diode • Transistors • Capacitors • LED, etc 14.2.2 Functions of the components and its symbols.	14.3.1 Use sketchers, charts or real objects to show students the various electronic component use on the Motor Vehicle. 14.3.2 Guide students to discuss the functions of the electronic component used on motor vehicle.

CERTIFICATE TWO - TRADE THEORY

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUE
15.0	CABLES AND CIRCUIT PROTECTION	15.1.1 Classification of cables 15.1.2 Colour coding. 15.1.3 Fuse and fusible links.	15.2.1 Classification methods. 15.2.2 Reasons why cables are colour coded. 15.2.3 Purpose of a fuse and fuse ratings.	15.3.1 Guide students to classify the various kinds of cable and the reasons why cables are colour coded. 15.3.2 Explain the purpose of fuse and its ratings to students

CERTIFICATE TWO - TRADE SCIENCE AND CALCULATIONS

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUE
1.0.	OHM'S LAW	1.1. Definition and calculations of Ohms Law	.1.2. Solve problems on the following circuit: i. Series circuit ii. Parallel circuit iii. Series parallel circuit	1.3. Guide trainees to define Ohms Law and solve the problems on circuit listed in the sub-point.
2.0.	CAPACITOR AND RESISTOR	2.1. Types of capacitors and their applications	2.2. Solve simple calculations relating to capacitors	2.3. Assist trainees to solve simple calculations on capacitors
3.0.	A.C. AND D.C. MOTORS	3.1. Calculation of electromotive force (E.M.F.) and torque	3.2. Relationship between back E.M.F and speed	3.3. Assist trainees to solve simple problems on D.C. and A.C. motors and the relationship between back E.M.F. and speed.
4.0.	ELECTRICAL MEASURING INSTRUMENT	4.1. Digital and analogue measuring instrument	4.2. Differences between analogue and their uses.	4.3. Assist trainees by using real object to explain the differences between digital and analogue measuring instruments and their uses.
5.0.	MAGNETIC CIRCUIT	5.1. Simple calculations on magnetic circuit. i. Current flow ii. Reluctance of the circuit	5.2. Relationship between the circuit flow and reluctance of the circuit and their unit.	5.3. Assists trainees to solve simple calculations on magnetic circuits.
6.0.	TRANSFORMERS	6.1. Types of transformers i. Step-up ii. Step-down	6.2. Simple calculations on transformers e.g. a. number of turns in each windings b. current in each windings c. efficiency	6.3. Guide trainees to solve simple calculations on transformers listed in the sub-point.

CERTIFICATE TWO - TRADE SCIENCE AND CALCULATIONS

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUE
7.0	POWER FACTOR	7.1. Single and three phase induction motors	7.2. Simple calculations on power factor E.g. a. Current b. Input power	7.3. Guide trainees to do simple calculations on power factor listed in sub-point.
8.0	SEMI-CONDUCTORS	8.1 Principles of operations	8.2. Explain the principles of operations of the semi-conductors	8.3 Assist by using a chart or a sketch to explain to trainees the principles of operations of a semi-conductors
9.0	TRANSISTORS		9.2. Basic calculations on transistors. E.g. voltage again	9.3 Guide trainees to do simple calculations on transistors listed in the sub-point.

CERTIFICATE TWO - TRADE DRAWING

TASK		CRITICAL SKILLS	SUB-SKILLS	INSTRUCTIONAL TECHNIQUE
1.0	CIRCUIT DIAGRAMS FOR HORN, BRAKE-LIGHT USING RELAYS	1.1 Sketching horn brake light with relays.	1.2 Horn, Brake-light with relays.	1.3 Assist trainees to sketch horn, brake light with relays.
2.0	HEAD LIGHT CIRCUIT	2.1 Sketching head light circuit	2.2 Single filament lamp, Dual filament lamp.	2.3 Guide trainees to sketch the following circuit listed in sub-skills.
3.0	STARTER CIRCUIT AND MOTOR DRIVE MECHANISM	3.1 Sketching starter circuit. (Schematic drawing starter circuit)	3.2 Solenoid switch, Armature, field coil in-board and out-board	3.3 Assist trainees to sketch the circuit listed in sub-skills.
4.0	GENERATOR CIRCUIT AND CONTROL BOARDS	4.1 Sketching generator circuit and control board.	4.2 Rectifier, startor rotor and IC regulator circuit.	4.3 Guide trainees to sketch the following circuit listed in sub-skills.
5.0	ALTERNATOR CONTROL DEVICES	5.1 Types of alternator control devices.	5.2 Electronic (IC) Mechanical (Relay)	5.3 Assist trainees to sketch the alternator control devices listed in sub-skills.
6.0	HORNS	6.1 Sketching of different types of horns.	6.2 High frequency, wind tone air horn	6.3 Guide trainees to sketch the following horns listed in sub-skills.
7.0	WIPER MOTOR LINKAGES	7.1 Sketch wiper motor linkages.	7.2 Link type drive flexible rack drive.	7.3 Assist trainees to sketch the link type and flexible rack drive linkage.
8.0	TRANSISTORIZED IGNITION SYSTEM	8.1 Sketch transistorized ignition circuit	8.2 Amplifier module, Pulse generator, ignition coil and distributor	8.3 Guide trainees to sketch the following listed in sub-skills
9.0	ELECTRICALLY OPERATE FAN CIRCUIT	9.1 Sketch electrically operated fan circuit.	9.2 Power source, ignition switch, ignition switch relay, fuse, fan motor and thermal switch	9.3 Guide trainees to sketch the circuit with the components listed in sub-skills.

CERTIFICATE TWO TRADE DRAWING

TASK		CRITICAL SKILLS	SUB-SKILLS	INSTRUCTIONAL TECHNIQUE
10.0	THERMOSTATS	10.1 Sketch types of thermostats.	10.2 Bellow and Wax type.	10.3 Assist trainees to sketch the two types of thermostats listed in the sub-skills
11.0	TRAFFIC INDICATOR CIRCUITS	11.1 Sketch traffic indicator circuit	11.2 Electronic flasher unit.	11.3 Assist trainees to sketch traffic indicator circuit incorporated with Electronic flasher unit.
12.0	SOLID GEOMETRY	12.1 Prism, Cylinder and Cones	12.2 Construction of Prism, Cylinder and Cones.	12.3 Assist students to construct solid geometry.
13.0	ORTHOGRAPHIC PROJECTION	13.1 First and third angle projection	13.2 Front view, end view and plan	13.3 Guide trainees to draw orthographic projection.
14.0	SECTIONAL VIEWS	14.1 Sectional views of engineering blocks.	14.2 Half section and Full section of engineering views.	14.3 Help trainees to draw sectional views of engineering blocks

PRACTICALS – CERTIFICATE TWO

TASK		CRITICAL SKILLS	SUB-SKILLS	INSTRUCTIONAL TECHNIQUE
1.0	WORKSHOP PRECAUTIONS	1.1 Differentiate between the various types of safety in the workshop.	1.2 Note the types of safety in the workshop. <ul style="list-style-type: none"> i. Safety when handling battery. ii. Safety when handling hazardous, toxic and flammable substances. iii. Safety when using electrical equipment, eg High rate discharged tester. 1.2.1 Battery charger, etc.	1.3 Discuss with students how to observe safety in the workshop when handling the equipment in the sub-skills.
2.0	BATTERY TESTING	2.1 Testing of battery under various conditions.	2.2 The various conditions for which the battery is tested are; <ul style="list-style-type: none"> ✓ Visual Inspection. ✓ State of charge ✓ Load Test 	2.3 Guide students how to undertake the various tests on battery.
3.0	TESTING AND MAINTENANCE OF AKALINE BATTERIES	3.1 How to test and maintain alkaline battery	3.2 Using hydrometer; <ul style="list-style-type: none"> a) To perform specific gravity test of the electrolyte (Potassium hydroxide). b) Periodically check electrolyte level and ensure no trace of acid trace is contaminated with the cells. 	3.3 Assist student to perform the testing and maintenance of Alkaline battery.

PRACTICALS – CERTIFICATE TWO

TASK		CRITICAL SKILLS	SUB-SKILLS	INSTRUCTIONAL TECHNIQUE
4.0	PRACTICAL DEMONSTRATIONS OF ELECTROMAGNETIC SWITCHES	4.1 Various types of magnetic switches and their operation.	4.2 Using relay to connect a horn circuit.	4.3 Guide student to connect analog in a horn circuit.
5.0	HEAD LIGHT ALIGNMENT	5.1 How to perform head light alignment.	5.2 Using optical beam a) Setter to align the head lamp. b) In the absence of optical beam setter, use non special equipment such as aiming board to align the head-light beam.	5.3 Guide student to use optical beam setter and non-special equipment aiming board to align head light beam.
6.0	DISMANTLING AND RE-ASSEMBLING OF STARTER MOTORS.	6.1 How to dismantle and assembling of starter motors.	6.2 Using the necessary; a) Tools to dismantle and assembling. b) Diagnosing and rectification of fault.	6.3 Demonstrate with students how to dismantle, assemble, diagnose and rectify faults in starter motors.
7.0	DISMANTLING AND ASSEMBLING OF A.C. GENERATOR (ALTERNATOR)	7.1 Procedure for dismantling and assembling, diagnosing and fault rectification of a.c. generator (Alternator).	7.2.1 Using the required tools to dismantle and assembling. 7.2.2 Diagnosing and rectification of fault.	7.3 Guide students how to dismantle, assemble, diagnose and rectify fault in a.c. generator (Alternator).
8.0	CHECKING ALTERNATOR OUT-PUT	8.1 Method of checking alternator out-put	8.2 Checking the alternator out-put (voltage and current by using Voltmeter and Ammeter.	8.3 Assist student to undertake the out-put test of the alternator.
9.0	DISMANTLING AND RE-ASSEMBLING OF HORN	9.1 How to dismantle and assembling of Horns.	9.2 Holding the horn bracket in a bench vice, connecting it to the battery, turning the adjustment screw gradually until the correct tone is obtained.	9.3 Guide the students to dismantle, assemble and adjust the horn.

PRACTICALS – CERTIFICATE TWO

TASK		CRITICAL SKILLS	SUB-SKILLS	INSTRUCTIONAL TECHNIQUE
10.0	DISMANTLING AND ASSEMBLING OF WIPER MOTOR	10.1 Method of dismantling and assembling of wiper motor.	10.2 Using the right tool to dismantle and assemble wiper motor, to diagnose and rectify fault.	10.3 Demonstrate method of dismantling, assembling, diagnosis and rectification of fault in wiper motors.
11.0	TESTING PROCEDURE ON TRANSISTORIZED IGNITION SYSTEM	11.1 Method of testing transistorized ignition system.	11.2.1 Testing the coil's resistance on the various terminals by the use of ohmmeter. 11.2.2 Checking current from ignition switch through module to coil. Low tension terminal with Ammeter.	11.3 Demonstrate to student how to perform the various tests in the sub-skills.
12.0	FAULT DIAGNOSIS AND RECTIFICATION IN TRAFFIC INDICATOR CIRCUITS	12.1 Procedure for fault diagnosis and rectification in traffic indicator circuit.	12.2 Using test lamp to the following; <ul style="list-style-type: none"> • Fuse • Flasher unit • Trafficator switch 	12.3 Guide student to conduct the various test in sub-skills.
13.0	FUEL TANK REMOVAL, EXAMINATION OF GAUGES AND ASSEMBLING	13.1 How to remove fuel tank.	13.2 Removing fuel tank and transmitter unit. Inspect the unit and adjust if necessary.	13.3 Demonstrate to student removal and inspection.
14.0	DISMANTLING AND ASSEMBLING OF HORNS	14.1 How to dismantle and assemble Horns	14.2 Holding the horn bracket in a bench vice, turning the adjustment screw gradually to obtain the right tone.	14.3 Guide student to dismantle, assemble and adjust the horn for the right tone.
15.0	DISMANTLING AND RE-ASSEMBLING OF WIPER MOTOR	15.1 Procedure for dismantling and assembling of wiper motor.	15.2 Using required tools to dismantle, assemble, diagnose and rectify fault in wiper motor.	15.3 Demonstrate with students, dismantling, assembling, diagnosing and rectification of faults.

PRACTICALS – CERTIFICATE TWO

TASK		CRITICAL SKILLS	SUB-SKILLS	INSTRUCTIONAL TECHNIQUE
16.0	TESTING PROCEDURE ON TRANSISTORIZED IGNITION SYSTEM	16.1 Method of testing procedure on transistorized ignition system.	16.2 Checking resistance, current flow from ignition switch through the module to the low tension terminal with ohmmeter Ammeter.	16.3 Assist student to use Ammeter and ohmmeter to perform the activity listed in critical skills.
17.0	TESTING OF ALTERNATOR COMPONENT	17.1 Testing procedure for alternator components.	17.2 Use ohmmeter to conduct the following test; a) Continuity test b) Short circuit test c) Ground circuit test	17.3 Guide students to conduct the test.
18.0	VOLTAGE REGULATOR TESTING	18.1 Method of testing Voltage regulator.	18.2 On the vehicle whiles the engine is running use voltmeter and Ammeter to measure; <ul style="list-style-type: none"> • Out put Voltage • Field current • Out put current 	18.3 Demonstrate to students how to connect the measuring instrument correctly.

**LEVEL – CERTIFICATE TWO – TEST SPECIFICATION TABLE
(TRADE THEORY)**

NO	TOPIC	COGNITIVE KNOWLEDGE	AFFECTIVE UNDERSTANDING	PSYCHOMOTOR APPLICATION	TOTAL
1.	Batteries	-	3	-	3
2.	Nikel Alkaline Batteries	-	3	-	3
3.	Switches	1	2	-	3
4.	Lighting system	2	1	-	3
5.	Motors	2	2	-	4
6.	Electrical symbols	2	1	-	3
7.	Horns	-	3	-	4
8.	Starting system	-	3	-	4
9.	Charging system	1	3	-	5
10.	Electronic ignition	-	4	-	4
11.	Auxiliary circuits	2	2	-	4
12.	Fuel gauges	3	1	-	4
13.	Components of air conditioner	1	3	-	4
14.	Fundamentals of electronics	3	1	-	4
15.	Cables and circuit protection	2	2	-	4
16.	Testing procedure on transistorized ignition system	1	3	1	5
17.	Testing of alternator component	1	1	3	5
18.	Voltage regulator testing	1	1	3	5

**LEVEL – CERTIFICATE TWOE – TEST SPECIFICATION TABLE
(SCIENCE AND CALCULATIONS)**

NO	TOPIC	COGNITIVE KNOWLEDGE	AFFECTIVE UNDERSTANDING	PSYCHOMOTOR APPLICATION	TOTAL
1.	Ohms Law	1	-	3	4
2.	Capacitors and Resistors	-	-	1	1
3.	A.C. and D.C. Motors	1	-	3	4
4.	Electrical Measuring Instruments	-	-	-	-
5.	Magnetic Circuits	-	-	2	2
6.	Transformers	2	-	1	3
7.	Power factor	-	-	1	1
8.	Semi-conductor	2	-	-	2
9.	Transistors	-	-	2	2

**LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE
(DRAWING)**

NO	TOPIC	COGNITIVE/ KNOWLEDGE	AFFECTIVE/ UNDERSTANDING	PSYCHOMOTOR APPLICATION	TOTAL
1.	Ohms Law	1	-	3	4
2.	Capacitors and Resistors	-	-	1	1
3.	A.C. and D.C. Motors	1	-	3	4
4.	Electrical Measuring Instruments	-	-	-	-
5.	Magnetic Circuits	-	-	2	2
6.	Transformers	2	-	1	3
7.	Power factor	-	-	1	1
8.	Semi-conductor	2	-	-	2
9.	Transistors	-	-	2	2

**LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE
(TRADE PRACTICAL)**

NO	TOPIC	COGNITIVE/ KNOWLEDGE	AFFECTIVE/ UNDERSTANDING	PSYCHOMOTOR APPLICATION	TOTAL
1.	Safety precaution	1	2	-	3
2.	Tools and equipment	2	1	-	3
3.	Basic component of auto electrical system	-	2	1	3
4.	Battery	1	2	1	4
5.	Cable	1	-	2	3
6.	Soldering	2	-	1	3
7.	Fuse	1	2	-	3
8.	Fault in wiring circuit	1	2	-	3
9.	Switches	1	1	-	2
10.	Flasher units	1	2	-	3
11.	Gauges	2	1	-	3
12.	Fans	2	1	-	3
13.	Lighting system	1	-	3	4
14.	Dismantle and re-assemble of wiper motors	-	1	2	3
15.	Removal and mounting of head lamps	1	-	2	3
16.	Dismantle and re-assemble of generator	-	1	2	3
17.	Dismantling and re-assembling of wiper motor		2	1	3
18.	Testing procedure on transistorized ignition system	-	1	2	3
19.	Testing of alternator component	-	2	1	3
20.	Voltage regulator testing	-	1	1	2