

# CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

Technical and Vocational Education Examinations

JUNE XXXX

INTERMEDIATE LEVEL

Subject Title	<b>ELECTRICAL/ELECTRONIC TECHNOLOGY</b>
Paper No	<b>Paper 3</b>
Subject Code	<b>5135</b>

**3 Hours**

This paper is comprised of **TWO** parts which are:

**PART I-FAULT TRACING**

**PART II- REPAIRS AND MEASUREMENT**



**ELECTRICAL/ELECTRONIC TECHNOLOGY  
5135**

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**PART I  
FAULT TRACING**

**Time: One Hour**

**INSTRUCTIONS TO SUPERVISORS ONLY**

Candidates shall choose by ballot one fault from the list of **TWO** main engine systems, the fuel supply system

- ❖ Examiners shall simulate one fault on each of these systems.
- ❖ They should however ensure that the engine is in good working order before the simulation is carried out.
- ❖ Candidates should be reassured of the good working order of the engines on which they will perform the fault tracing.
- ❖ Examiners should closely watch the candidates during their work so that the method used is noted accordingly.
- ❖ Examiners should closely watch the candidates and **INTERVENE IF NEED BE** during the fault tracing. This is to avoid damages that may be caused by the candidate.
- ❖ In case of any disorder in their work that might lead to damage or injury, the examiners should immediately stop the candidates.
- ❖ All fault tracing forms must be corrected or marked in front of the candidates so that coherence in the method and onward skills can be objectively evaluated.
- ❖ Examiners shall ask questions in relation to the each candidate's work without necessarily intimidating or frustrating the candidate.
- ❖ The list of proposed faults to be simulated is found below:
  - This part is made up of three main sections (A), (B) and (C), each section is comprised of four topics.
  - By ballot, the candidate is expected to choose a topic either under section A, B, or C.
  - The examiner(s) shall provide the candidate with **ALL** the necessary working materials.
  - All the candidates are expected to answer the oral written questions at once before proceeding to the practical phase.
  - The written exercise must not **EXCEED** 15minutes

- ❖ Make sure that you hand in the answered questions back to the examiners.

**SECTION A: ignition (15 mins)**

- 1- Dismount the battery's positive terminal
- 2- Disrupt the engine's firing order.
- 3-Fit bad spark plugs.
- 4-Dismount electromagnetic fuel injectors.
- 5- Completely close the contact points.
- 6- Untie the cable of the ignition coil's primary circuit.
- 7-Remove the distributor's rotor

**SECTION B: Lighting and signalization system (15 mins)**

- 1- Remove the horn
- 2- Remove the headlamp bulbs
- 3- Disconnect the flasher unit
- 4- Disconnect the battery's terminals

**SECTION C: The starting system (15 mins)**

- 1- Make lose the fan belt
- 2- Fit a bad alternator.
- 3- Suppress the charging current.
- 4- Fir a bad Battery.

N.B: The candidate is expected to trace all the faults and put back the circuit in a functional state.  
This section MUST ONLY be handled by the examiners.

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**FAULT TRACING**

NAME OF CANDIDATE-----  
CODE NUMBER-----  
DATE-----



CODE NUMBER-----  
TVE INTERMEDIATE LEVEL  
DATE-----

**WRITTEN QUESTIONS (5marks)**

1- What is the function of the alternator?

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2- Can a charger with an output voltage of 8 volts charge a 12 volt battery?

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3- Can we say that an ignition coil is a transformer? Justify your answer

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4- What are the differences between a cold plug and a hot plug and on which types of engines are they used?

5- State the role of a relay in an electric circuit.

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**PART I  
FAULT TRACING**

**Time: One Hour**

**WORK REQUIRED.**

The candidates are expected to:

1. Use appropriate tools and correct methodologies to trace the faults simulated, then start and proceed to engine tuning.
2. Carry out a complete engine tune-up using the appropriate equipment supplied by the examiners.
3. Answer the question that shall be posed by the examiners.
4. Fill the fault tracing form.

<b>PART 1: FAULT TRACING</b>				
<b>S/N</b>	<b>Item</b>	<b>Maxi. mark</b>	<b>Score</b>	<b>Remarks</b>
1	Out fit	02		
2	Procedure	04		
3	Faults traced	06		
4	Proper use of instruments	06		
5	Corrective action taken	06		
6	Answers to questions	06		
7	Respect of time	04		
8	Filling of form	04		
<b>PART 1 TOTAL</b>		<b>40</b>		

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**PART II-REPAIRS AND MEASUREMENTS**

**Time: Two Hours**

**WORK REQUIRED.**

**A-For repairs**

- Dismount
- Dismantle
- Inspect and determine faults
- Repair component
- Remount
- Adjust
- Test
- Establish a report ( see table1)
- Answer the questions from the examiners.

**B-For measurements**

- Check;
- Take measurements
- Compare values obtained with the manufacturer's specifications
- Establish a form( see table 2)
- Answer the questions from the examiners.

**PART II: REPAIRS AND MEASUREMENTS**

**REPAIRS**

1	Dismounting	02		
2	Dismantling	01		
3	Faults identified	02		
4	Choice and mastery of tools	02		
5	Pertinence of checks and adjustments carried out	03		
6	Results obtained	06		
7	Remounting	04		
8	Respect of time given	04		
9	Testing	06		
10	Answers to questions	05		
11	Filling of the repair form	05		
<b>SECTION A TOTAL</b>		<b>40</b>		
<b>MEASUREMENTS</b>				
1	Preparation of the work post	02		
2	Use of apparatus	02		
3	Pertinence of the measurement	02		
4	Result obtained	03		
5	Respect of time given	02		
6	Testing	02		
7	Answers to questions	03		
8	Filling of measurement form	04		
<b>SECTION B TOTAL:</b>		<b>20</b>		

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**PART II-REPAIRS AND MEASUREMENTS**

**Time: Two Hours**

**INSTRUCTIONS TO SUPERVISORS**

The candidates shall choose by ballot in the presence of the examiners, one of the components on the list “A” and “B”. Each number chosen by ballot corresponds simultaneously to the number on list the “A” for repairs and on the list “B” for measurement.

An example: If a candidate chooses figure 1 in the ballot, it automatically corresponds to:

- A, the starter motor for “Repairs ”
- B, Battery “Measurements”
- ❖ At the end of the first work post, that is repairs, the candidate shall answer **THREE** questions from the examiners, chosen among the set of questions given below.
- ❖ For the second part, that is measurements, the examiners shall ask **THREE** questions of their choice, in relation to the component chosen on the work post.

The marking of tables 1 and 2 shall be done in front of the candidate’s work post in order to verify the exactness of the latter’s work.

**Table of list A and B**

N°	List A	List B
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1	Electric fuel pump	relays
2	Wiper motor	Battery
3	Starter motor	Flasher unit
4	Electric window motor	alternator
5	Ignition distributor	Battery

**Proposed questions** (these must not be kept within the reach of the candidates)

1. Outline the method of work on this component and precise the necessary tools to be used.
2. State two regular faults that likely occur on this component.
3. State the origin of each fault.
4. Explain how you would remedy the faults when noticed.
5. What advice will you give to the user to prevent and or increase the working life span of the component?

### FAULT TRACING FORM

NAME OF CIRCUIT OR COMPONENT	CHECKS	INSTRUMENT(S) USED	VALUES		POSSIBLE FAULTS	REMEDIES
			GIVEN	FOUND		

**EXAMINER(S) OBSERVATION**

**EXAMINER'S NAME AND SIGNATURE:**

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**REPAIRS AND MEASUREMENT FORM**

**TABLE 1: REPAIRS**

Nº	Phase	Operation Nº	Operation	Duration	Duration of operation	Technical information (and diagram)	Tools	Conclusion

**TABLE 2: MEASUREMENTS**

NAME OF ORGAN	CHECKS	MEANS USED	VALUES		APPRECIATION		CONCLUSION
			GIVEN	FOUND	GOOD	BAD	

**CONCLUSION**



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**WRITTEN QUESTIONS REPAIRS AND MEASUREMENT**

*Answer all questions in the spaces provided*

1. Give two types of starter motors

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2. Why do we adjust the head lamps?

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3. What is the role of the electronic control module?

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4. How can we identify a bad battery:

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5. Give one effect of low battery voltage

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**EVALUATION SHEET**

**Centre No:** ..... **Centre Name:** .....

**Candidate's Name:**  
.....

**Candidate's Number:** ..... **Code No:** .....

<b>PART 1: FAULT TRACING</b>				
<b>S/N</b>	<b>Item</b>	<b>Maxi. mark</b>	<b>Score</b>	<b>Remarks</b>
1	Out fit	02		
2	Procedure	04		
3	Faults traced	06		
4	Proper use of instruments	06		
5	Corrective action taken	08		
6	Answers to questions	06		
7	Respect of time	04		
8	Filling of form	04		
<b>PART 1 TOTAL</b>		<b>40</b>		
<b>PART II: REPAIRS AND MEASUREMENTS</b>				
<b>REPAIRS</b>				
1	Dismounting	02		
2	Dismantling	01		
3	Faults identified	02		
4	Choice and mastery of tools	02		
5	Pertinence of checks and adjustments carried out	03		
6	Results obtained	06		
7	Remounting	04		
8	Respect of time given	04		
9	Testing	06		
10	Answers to questions	05		
11	Filling of the repair form	05		
<b>PART II TOTAL</b>		<b>40</b>		
<b>MEASUREMENTS</b>				
1	Preparation of the work post	02		
2	Use of apparatus	02		
3	Pertinence of the measurement	02		
4	Result obtained	03		
5	Respect of time given	02		
6	Testing	02		
7	Answers to questions	03		
8	Filling of measurement form	04		
<b>PART II TOTAL:</b>		<b>20</b>		
<b>GRAND TOTAL</b>		<b>100</b>		

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**PAPER 3 - PRACTICALS**

**ADVANCED INFORMATION TO CENTRES**

**PART I: FAULT TRACING**

Material estimate per candidate for fault tracing

S/N	DESIGNATION	QTY	U.P	Amount
1	Spark plug	1 set	4000	4000
2	Flasher unit	1	1500	1500
3	Contact breaker point	1set	2500	2500
<b>GRAND TOTAL</b>				8000frs

**PART II: REPAIRS AND MEASUREMENTS**

Nº	List A	List B
1	Alternators	Head lamp bulbs
2	Electric Horn	condenser
3	Starter motor	Flasher unit
4	Washer motor	Spark plug
5	Ignition distributor	Battery

List of material needed for repairs:

- 1-Electric fuel pump
- 2-Wiper motor
- 3-Starter motor
- 4-Electric window motor
- 5-Ignition distributor
- 6- A complete vehicle with a carburetor operated engine.
- 7- A complete vehicle with petrol injection engine.

List of material needed for measurement:

- 1-relays
- 2-Battery
- 3-Flasher unit
- 4-alternator
- 5-Battery