

REGISTRATION CENTRE NUMBER	CENTRE NAME
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CANDIDATE'S FULL NAMES		
CANDIDATE IDENTIFICATION NUMBER	SUBJECT CODE 7165	PAPER NUMBER 3
FOR OFFICIAL USE ONLY		
CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD ADVANCED LEVEL EXAMINATION		
SUBJECT TITLE DIESEL ENGINE TECHNOLOGY	SUBJECT CODE 7165	PAPER NUMBER 3
EXAMINATION DATE: JUNE XXXX		

Duration 4 Hours

INSTRUCTIONS TO CANDIDATES

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

- PART I-FAULT TRACING**
- PART II- REPAIRS AND MEASUREMENT**
- PART III-ANALYSIS**

*You are advised to read carefully through the question paper, before you begin your answers.
You are reminded of the necessity for good English and orderly presentation in your answers.*

<i>FOR EXAMINERS' USE ONLY</i>	
Marked by.....	<u>SCORE</u>
Signature of Examiner:Date:.....	
Checked by.....	
Signature:..... Date:.....	

Turn Over

**DIESEL ENGINE TECHNOLOGY
7165**

CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD
General Certificate of Education Examination

JUNE XXXX

ADVANCED LEVEL

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: Fuel supply lines (15mins)

- 1- Block the exit of the tank
- 2- Disconnect the fuel filter arrival.
- 3- Disconnect the pipe supplying the injector pump
- 4- Untie the injectors.

SECTION B: Injection system (15mins)

- 1- Tighten the idling screw right down.
- 2- Disrupt the idling system.
- 3- Remove the fuel filter and reverse its sense.
- 4- Tighten the idling screw right down.

SECTION C: Engine systems (15mins)

- 1- Remove the fan belt.
- 2- Alter Fuel injection pump element
- 3- Make the bleeding of the low pressure circuit..
- 4- Make the bleeding of the low pressure circuit .

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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.

REPUBLIC OF CAMEROON
Peace-Work-Fatherland

MINESEC/GCE BOARD

“ADVANCED LEVEL”
Series: AUTOMOBILE REPAIRS MECHANICS
Session:
Time: 15 minutes

Practical paper

FAULT TRACING

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

✂.....
CODE NUMBER-----
ATC ADVANCED LEVEL
DATE-----

WRITTEN QUESTIONS (5marks)

1- Give two possible causes of a diesel engine who smokes black.

2- Why the in line injection pumps is more used on the trucks?

3- Which type of injector is met on the caterpillars?

4- When the bleeding of the high pressure circuit of a diesel engine is done? (At the rest or engine turning?)

5- Give two consequences of a diesel engine who smokes black.

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CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD
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ADVANCED LEVEL

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.

PART I: FAULT TRACING				
S/N	Item	Maxi. mark	Score	Remarks
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		
PART 1 TOTAL		40		

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ADVANCED LEVEL

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		
SECTION A TOTAL		40		
MEASUREMENTS				
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		
SECTION B TOTAL:		20		

DIESEL ENGINE TECHNOLOGY
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ADVANCED LEVEL

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 COMPLETE CYLINDER HEAD for "Repairs"
- B, the oil strainer type of pump for "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

Nº	List A	List B
1	Complete cylinder head	Strainer type of fuel pump
2	Cylinder block and crankshaft	Piston
3	Crankshaft	Camshaft
4	Injectors	Engine block
5	Injection pump	Crankshaft

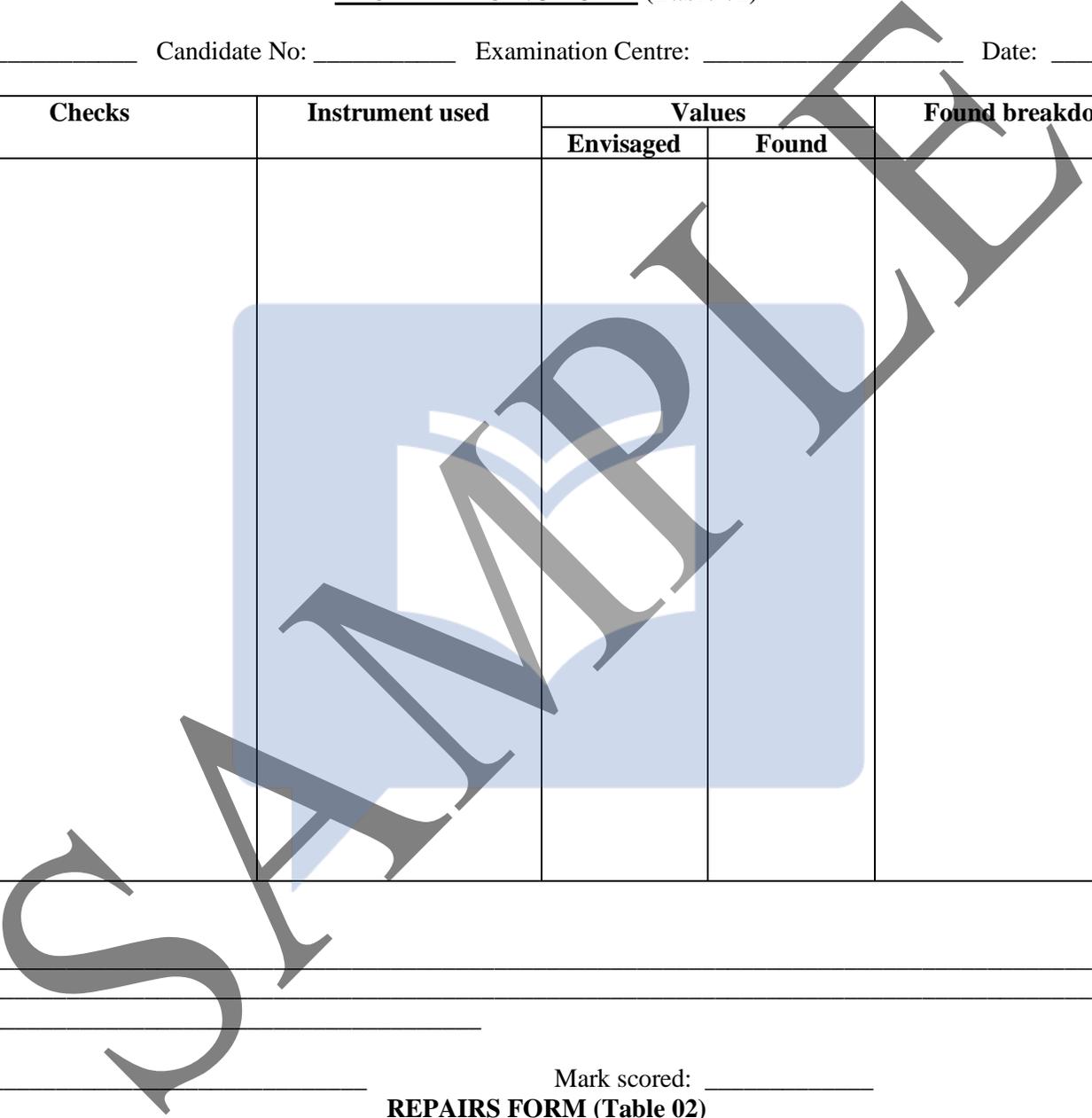
Proposed questions (these must not be kept within the reach of the candidates)

1. Outline the method of work on this component and precise the necessary tools to be used.
2. State two regular faults that likely to 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?

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FAULT TRACING FORM (Table 01)

Post balloted: _____ Candidate No: _____ Examination Centre: _____ Date: _____

Name of circuit or part	Checks	Instrument used	Values		Found breakdown	Decisions
			Envisaged	Found		
						

Conclusion:

Name and signature of examiner: _____

Mark scored: _____

REPAIRS FORM (Table 02)

Turn Over

Post balloted: _____ Candidate No: _____ Examination Centre: _____ Date: _____

N ^o phase	Phase	N ^o operation	Operation	Duration	Duration of operation	Technical information (and diagram)	Tools	Conclusion

Conclusion :

Name and signature of examiner: _____

Mark scored: _____

METROLOGY FORM (Table 03)

Turn Over

Post balloted: _____ Candidate No: _____ Examination Centre: _____ Date: _____

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

Conclusion :

Name and signature of examiner: _____

Mark scored: _____

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ADVANCEDLEVEL

Written Questions Repairs and measurement

Answer all questions in the spaces provided

1. During the valve's adjustment, their gives you the following values: 0.20mm and 0.30mm. For which valve correspond each value?

2. At what moment the bleeding of the high pressure circuit of a diesel engine is done? (Engine at rest or engine turning).

3. Give two possible causes of a loss of compression in a diesel engine.

4. Why do their adjust the operating valves?

5. Give two possible causes of a loss of compression in a diesel engine.

**DIESEL ENGINE TECHNOLOGY
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ADVANCED LEVEL

PART III-ANALYSIS

1. a) State four (4) possible causes and their remedies for an diesel engine starting with difficulties and turning with involuntary decelerations. **(6mks)**

Complaint	Possible causes (1mk×4 = 4mks)	Remedies (0.5mk×4 =2mks)
The diesel engine starts with difficulty and turns with involuntary decelerations.		

b) After some investigations you notice that there is air in the fuel supply circuit. You are now invited to identify the problem and provide the required remedy. In the table below, state systematically how you will proceed to resolve the problem. **(8mks)**

N°	Operation	Tool

In the process of carrying out the repairs you decided to do a general overhauling of the fuel line. You order the following spare part and the bleeding of low pressure circuit :

- 2 Pressure pipes
- 4 Pipe gaskets

It took you from 2h to overhaul the engine and bleed the low pressure circuit.

II) Work required :

- ❖ Calculate the labour cost, if the hourly rate is 5000 Frs.
- ❖ Calculate the cost of the spare parts, knowing that V.A.T is 19.25% on the total cost of spare parts.
- ❖ Prepare a bill to your customer.

Turn Over

Extract of spare parts catalogue:

N°	Designation	number	Unit price	Total price
1	Set of radiator hose	1	9000	9000
2	Fan relay	1	500	500
3	Fuel filter	1	2000	2000
4	Piston rings	1	5000	5000
5	Pipe gaskets	1	5000	5000
6	Water pump belt	1	2000	2000
7	Glow plugs	1	5000	5000
8	Thermal switch	1	3000	3000
9	Pressure pipes	1	4000	4000
10	Thermostat	1	7000	7000
11	Fusible link	1	2000	2000
12	Injectors	1	15000	15000
13	Pipe gaskets	1	1000	1000
14	Brake servo	1	45000	45000
15	Air filter Element	1	5000	5000

II-1) Calculation of the labour cost

(5mks)

II-2) Calculations of the spare parts cost

(2mks)

• V.A.T(19.25%)

(2mk)

• Total amount:

(1mk)

II-3) Bill

(5mks)

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DIESEL ENGINE TECHNOLOGY
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JUNE XXXX

ADVANCED LEVEL

EVALUATION SHEET

Centre No: Centre Name:

Candidate's Name:

Candidate's Number: Code N^o:

PART 1: FAULT TRACING				
S/N	Item	Maxi. mark	Score	Remarks
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		
PART 1 TOTAL		40		
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		
PART II TOTAL		40		
MEASUREMENTS				
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		
PART II TOTAL:		20		
GRAND TOTAL		100		

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ADVANCED LEVEL

PAPER 3 - PRACTICALS

ADVANCED INFORMATION TO CENTRES

PART I: FAULT TRACING

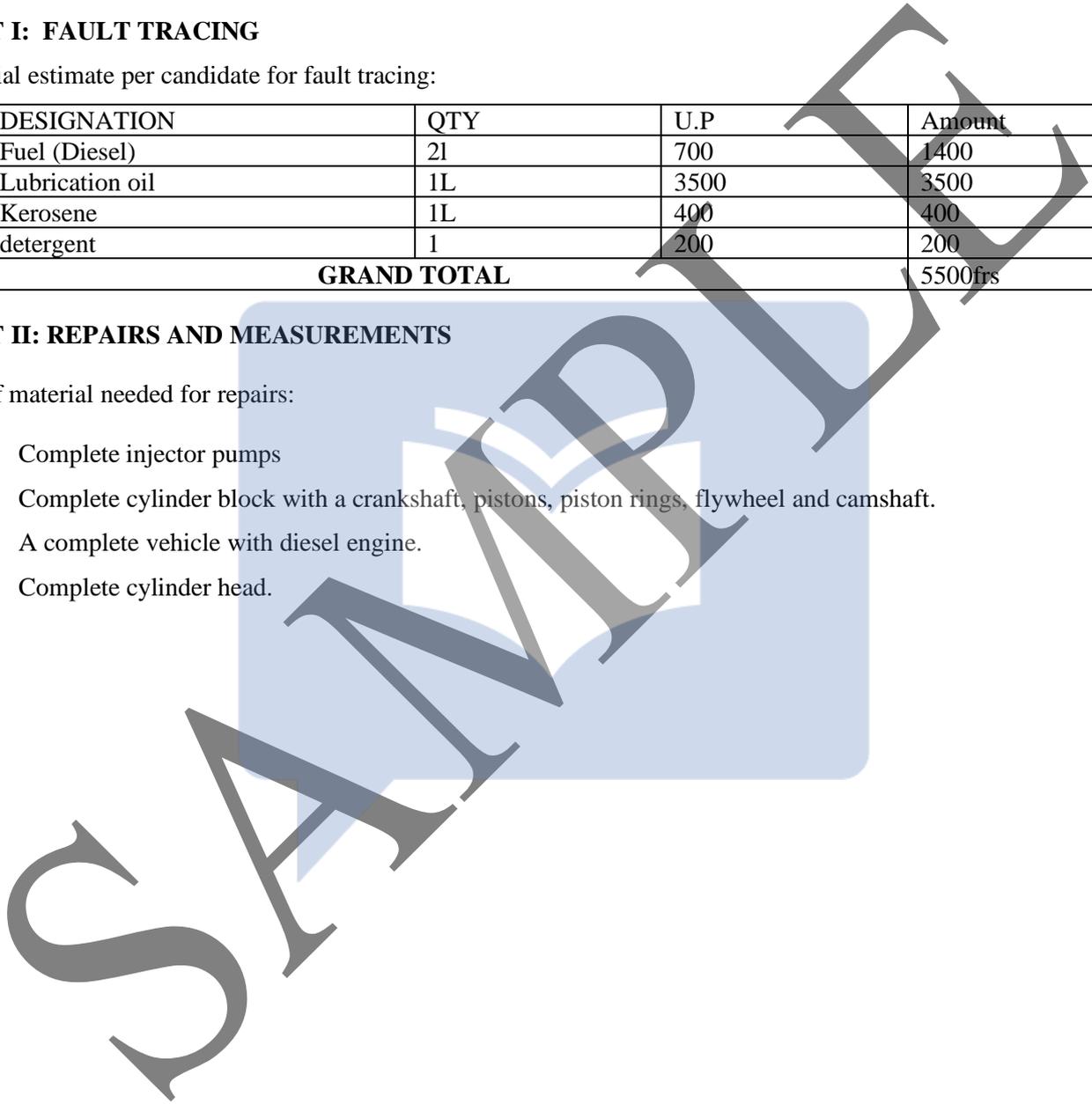
Material estimate per candidate for fault tracing:

S/N	DESIGNATION	QTY	U.P	Amount
1	Fuel (Diesel)	2l	700	1400
2	Lubrication oil	1L	3500	3500
3	Kerosene	1L	400	400
4	detergent	1	200	200
GRAND TOTAL				5500frs

PART II: REPAIRS AND MEASUREMENTS

List of material needed for repairs:

- 1- Complete injector pumps
- 2- Complete cylinder block with a crankshaft, pistons, piston rings, flywheel and camshaft.
- 3- A complete vehicle with diesel engine.
- 4- Complete cylinder head.



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