CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

Technical and vocational Education Examinations

JUNE XXXX **INTERMEDIATE LEVEL**

Subject Title	**MECHANICAL TECHNOLOGY**
Paper No	**Paper 3**
Subject Code	**5140**

Duration 3 Hours

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

PART I-FAULT TRACING

PART II- REPAIRS AND MEASUREMENT

2019/5140/3/C

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5140

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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 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- Suppress fuel supply to the tank
2- Fir a bad fuel pump
3- Fit a bad fuel filter.
4- Suppress fuel supply to injectors

SECTION B: Carburettion system (15mins)

1- Empty the fuel tank.

2- Remove the float's needle valve..

3- Fit a faulty carburetor float mechanism.

4- Make lose the idling screw

SECTION C: Engine systems (15mins)

1- Alter the valve timing.

2- Remove the fan belt.

3- Set lose the accelerator pump.

4- Untie the distributor's mounting bolt and let the distributor be loose.

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 will happen if the idling speed is too low?

2- State the role of the fuel pump?

3- Give two functions of the lubrication system?

4- Give one cause of engine overheating?

5- The term engine knock refers to?

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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.

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	06		
6	Answers to questions	06		
7	Respect of time	04		
8	Filling of form	04		
PART 1 TOTAL		**40**		

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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		
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**		

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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 Injectors for ‘‘Repairs ”
- B, Crankshaft ‘‘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

№	List A	List B
1	Injectors	Crank shaft
2	Complete cylinder head	Pistons and rings
3	Injection pump	Camshaft
4	Drum or disc brakes	Engine block
5	Single barrel carburettor	Flywheel

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:

2019/5140/3/C

TABLE 1: REPAIRS

Nº phase	Phase	Nº operation	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 typs of injectors used in diesel engines
   ……
   ……
   ……
   ……
   ……
   ……
2. Why do we carry out engine timing?
   ……
   ……
   ……
   ……
   ……
3. Why do diesel engines use heater plugs?
   ……
   ……
   ……
   ……
   ……
4. When air is trapped in the fuel lines of a diesel engine we called it:
   ……
   ……
   ……
   ……
   ……
5. Give one effect of contaminated fuel on engine performance

……
……
……
……

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EVALUATION SHEET

Centre No: …….. **Centre Name**:
……..
Candidate's Name:
……
Candidate's Number: …… **Code Nº**: ……

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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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	Fuel (petrol)	1l	700	700
3	Sand paper	1 sheet	100	100
4	Contact breaker point	1set	2500	2500
5	Lubrication oil	1L	3500	3500
GRAND TOTAL				10800frs

PART II: REPAIRS AND MEASUREMENTS

List of material needed for repairs:

1 – Complete Diaphragm type of fuel pumps
2- Complete Mechanical type of glass winder.
3- Steering gear box (rack and pinion)
4- Single barrel carburetor
5- Seat adjusting mechanism
6- A complete vehicle with a carburetor operated engine.
7- A complete vehicle with petrol injection engine.

List of material needed for measurement:

1-Complete cylinder head with valves
2-Cylinder block and crankshaft
3-Injection pump
4-Valve operating mechanism
5-Drum or disc brakes