CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD	SUBJECT CODE NUMBER **MA-6105**	SERIES/SPECIALTY **Automobile Repair Mechanics (MA)**
Probatoire de Brevet de Technicien Examinations	SUBJECT TITLE **Mechanical Technology**	
Date of Examination **Thursday 26 May 2016**	SESSION **JUNE 2016**	
TYPE OF EXAMINATION **WRITTEN**		

Duration : 8:00 – 11:00
Coefficient : SEE INSIDE

QUESTION AND ANSWER BOOKLET

NOTE:

1. Open wide this cover page of the booklet and enter the information required in the boxes provided overleaf.
2. Answer ALL questions, using the spaces provided
3. Write your answers in blue or black ink. The use of pencil is NOT allowed except specifically required for drawings, graphs and others.
4. Where the questions are on pages that are separate from the pages bearing the spaces meant for answers, you may tear off the pages containing the questions using a straightedge ruler.

NO OTHER ANSWER BOOKLET IS REQUIRED FOR THIS SUBJECT.

WRITE ALL YOUR ANSWERS INSIDE THIS BOOKLET

REPUBLIC OF CAMEROON
Peace –Work – Fatherland

MINESEC / GCE Board

PROBATOIRE de BT
Session : 20
Series : **AUTOMOBILE MECHANICS**
Time : 03 Hours
Coefficient : 02
Written Paper

MECHANICAL TECHNOLOGY

AUTHORISED DOCUMENTS.

No document apart from those given to the candidates by the examiner sis authorised.
NB: Before you begin, make sure that you have been given all the pages from 1/9 to 9/9.

This paper carries 40 marks

It has FOUR independent sections.

I. **MATERIALS**
II. **SAFETY**
III. **ENGINE**
IV. **CHASSIS**

SECTION 1 : MATERIALS (4mks)

I -1- Give the function of the following materials put in the furnace during the production of cast iron (0,75×2=1,5mk)

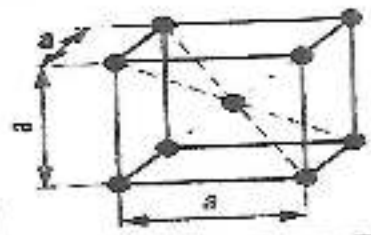
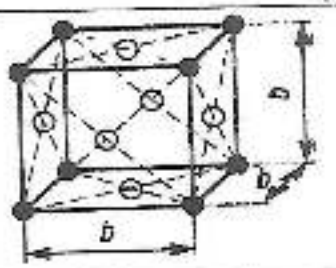
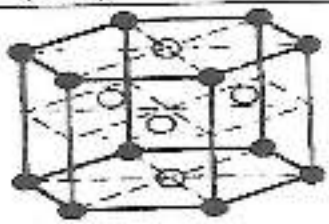
Coke : _____

_____

Flux: _____

_____

I -2- In the spaces provided, write down the names of each of the diagrams in the table below.

FIGURES (0,5x3=1,5mk)		
		
Name : _____ _____	**Name :** _____ _____	**Name :** _____ _____

I-3- The internal surface of an engine cylinder MUST resist wear.

1. State the name of the heat treatment it receives in order to fulfil this condition. **(0,5mk)**

_____

_____

2. Justify your answer. **(0,5mk)**

_____

_____

SECTION 2 : SAFETY (4mks)

II-1- State FOUR systems which actively participate in safety in a car. **(0,25×4=1mk)**

1. _____
2. _____
3. _____
4. _____

II -2- State TWO precautions to be observed before undertaking welding of a fuel tank. (0,5×2=1mk)

1. _____
2. _____

II.3 State four urgent rescue methods to be given to a victim seriously burnt by fire. (0,5×4=2mks)

1. _____
2. _____
3. _____
4. _____

SECTION 3: THE ENGINE (15,75marks)

III-1-1 DIESEL (8,75mks)

Figure 1 below represents a rotary fuel injection pump of the BOSCH VE type

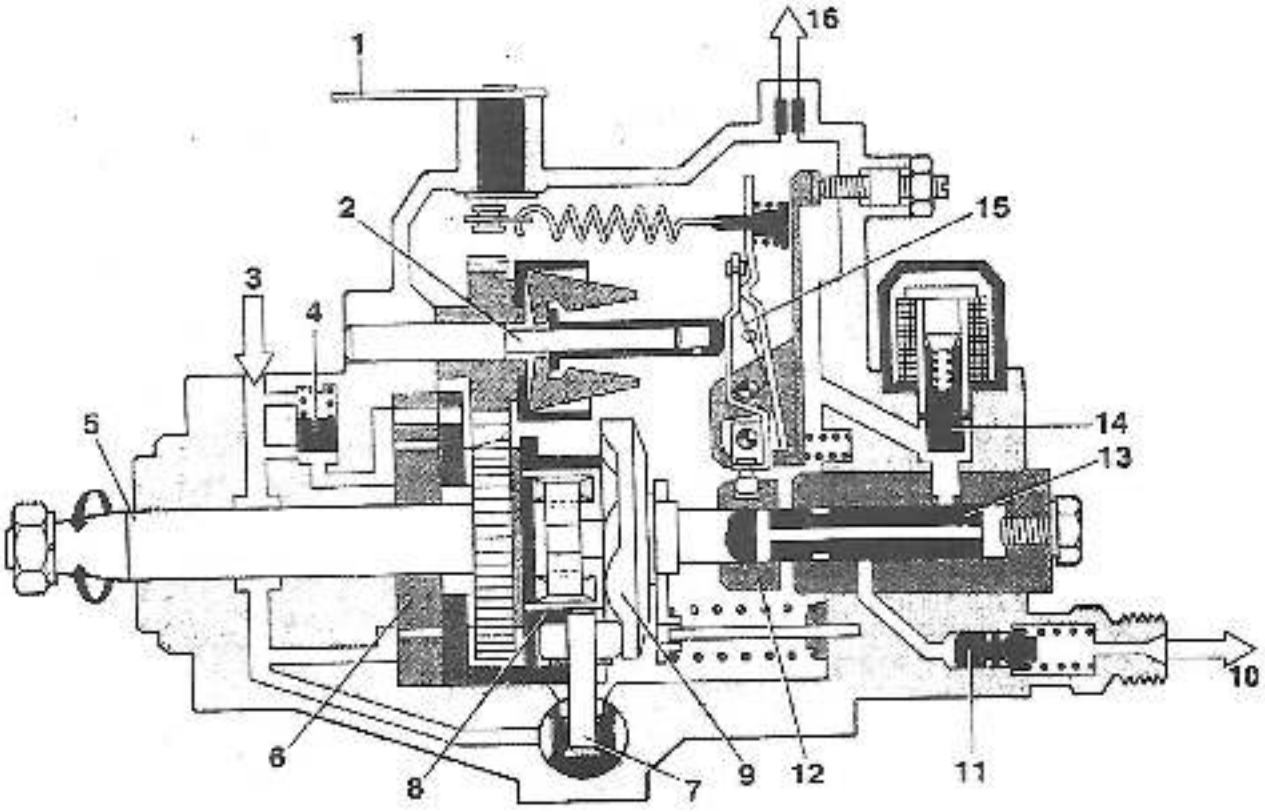
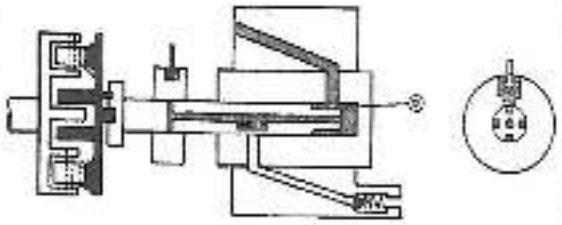
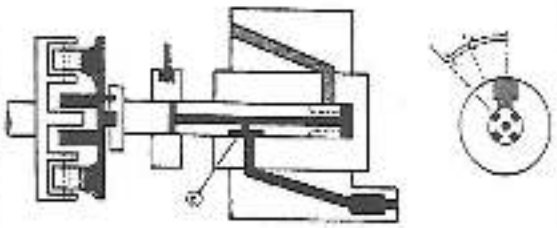
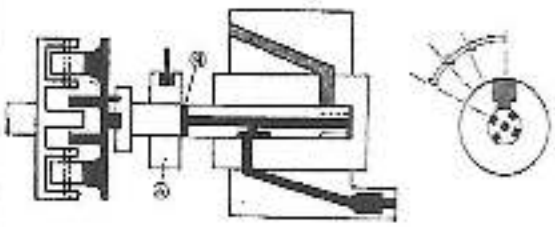


Figure 1

III.1.1.1 Fill the table below referring to figure1. **(4mks)**

Ref.	Names of parts *(0,25×4=1mk)*	Functions *(0,5×4=2mks)*
2		
12		
13		
14		

III.1.1.2 Explain the principle of operation of this pump by filling the table below (1×3=3mks)

Phases	Sketches	Explanations. *(1×3=mk)*
Fuel supply		
Start of injection		
End of injection		

III.1.1.3 The engine equipped with this pump does not react to acceleration proportionally to the action on the pedal. Sate TWO possible causes of this fault as well as the checks to be carried out. **(0,5×4=2mks)**

Fault	Possibles causes	Checks to be carried out
The engine does not accelerate proportionally to the action on the pedal		

III-1-2 PETROL INJECTION. (4,5mks)

Figure 2 below shows a petrol injection system of the Bosch L- jetronic type.

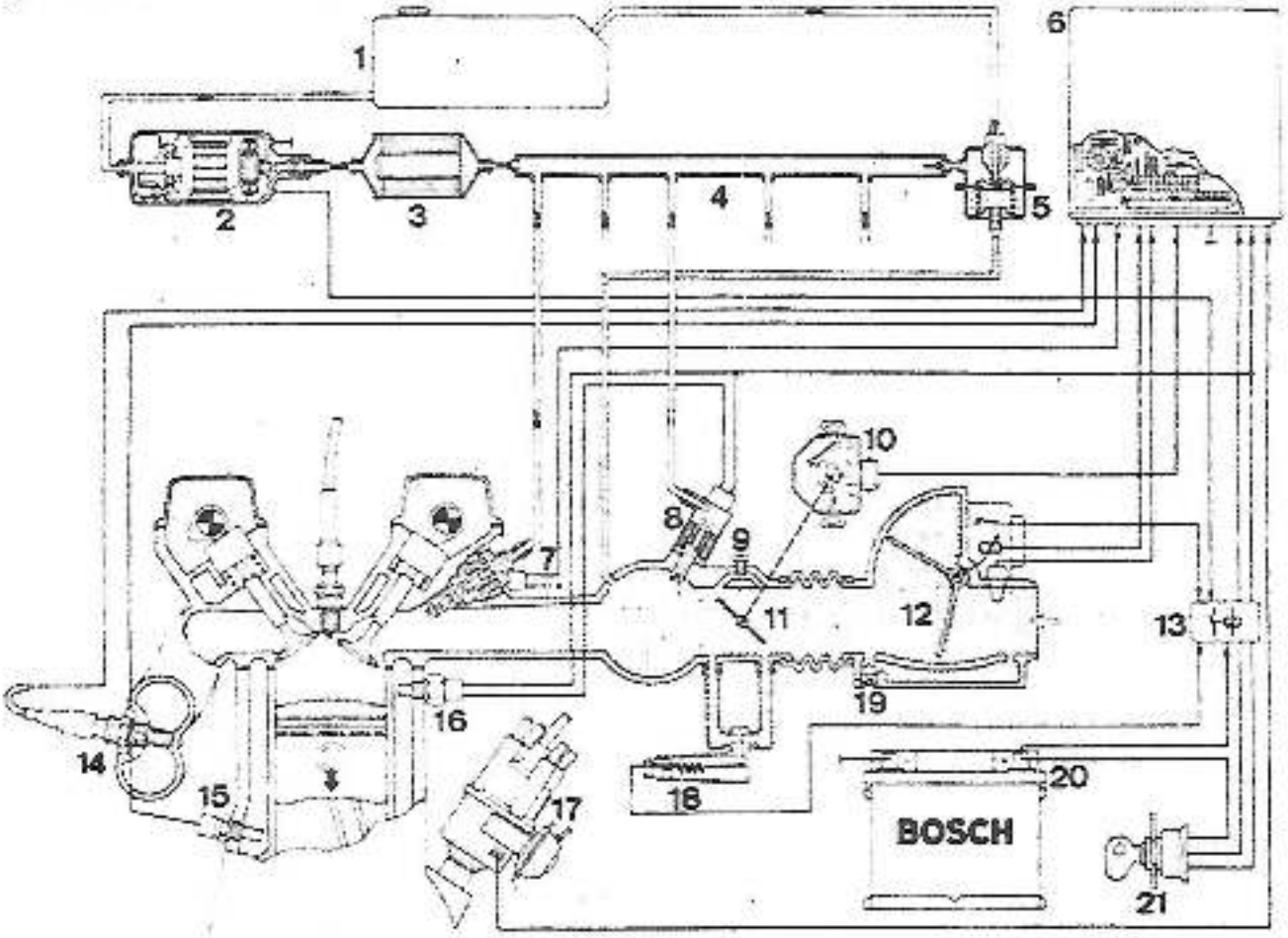


Figure 2

III.1.2.1 Fill the table below (4mks)

Ref.	Names of parts *(0,25×4=1mk)*	Functions *(0,5×4=2mks)*
5		
6		
10		
18		

III.1.2.2 State TWO parameters required for the ECU to determine the quantity of fuel to be injected. **(0,25×2=0,5mk)**

1. _____
2. _____

III.1.2.3 In case of failure of the part numbered 13, how will the engine behave? **(0,5mk)**

_____

_____

_____

Justify your answer. **(0,5mk)**

_____

_____

_____

III-1-3 VALVES AND VALVE TRAIN (3mks)

Figures 3 shows four types of valve trains

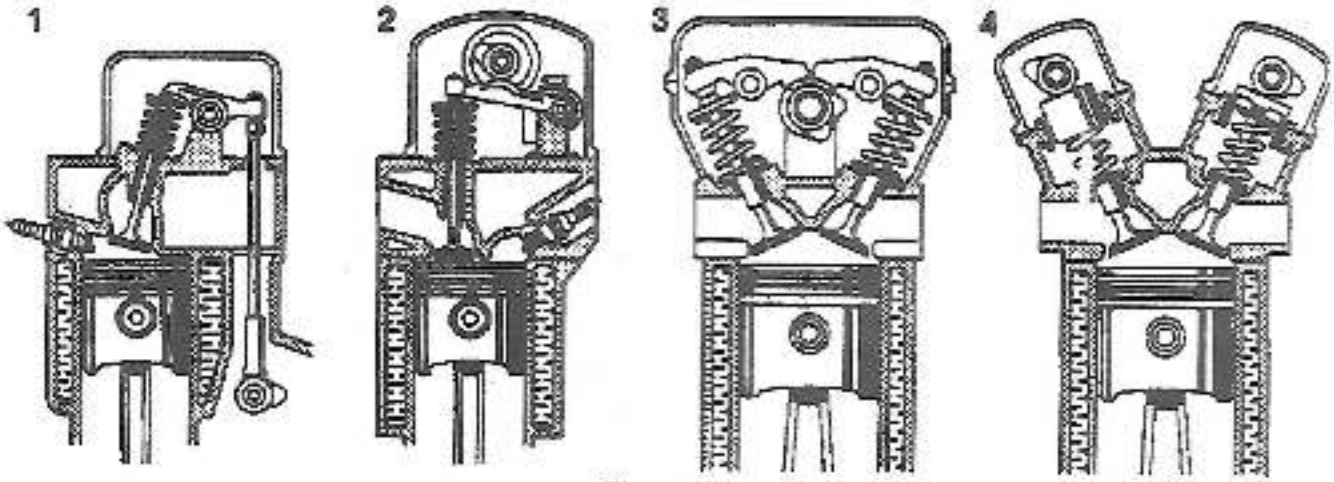


Figure 3

III.1.3.1 Write down the name of type in the table below as indicated accordingly. **(0,25×4=1mk)**

Figure N°	Names *(0,25×4=1mk)*
1	
2	
3	
4	

III.1.3.2 State FOUR consequences of very poor adjustment of valves. **(0,5×4=2mks)**

Valve clearances	Consequences *(0,5×4=2mks)*
Too big	- -
Insufficient	- -

IV - CHASSIS (16,75mks)

IV - 1 TRANSMISSION. (9,25mks)

Figure 4 below shows a cross sectional view of the transmission mechanism of PEUGEOT 306, equipped with an MA5 gearbox marked 2CB60.

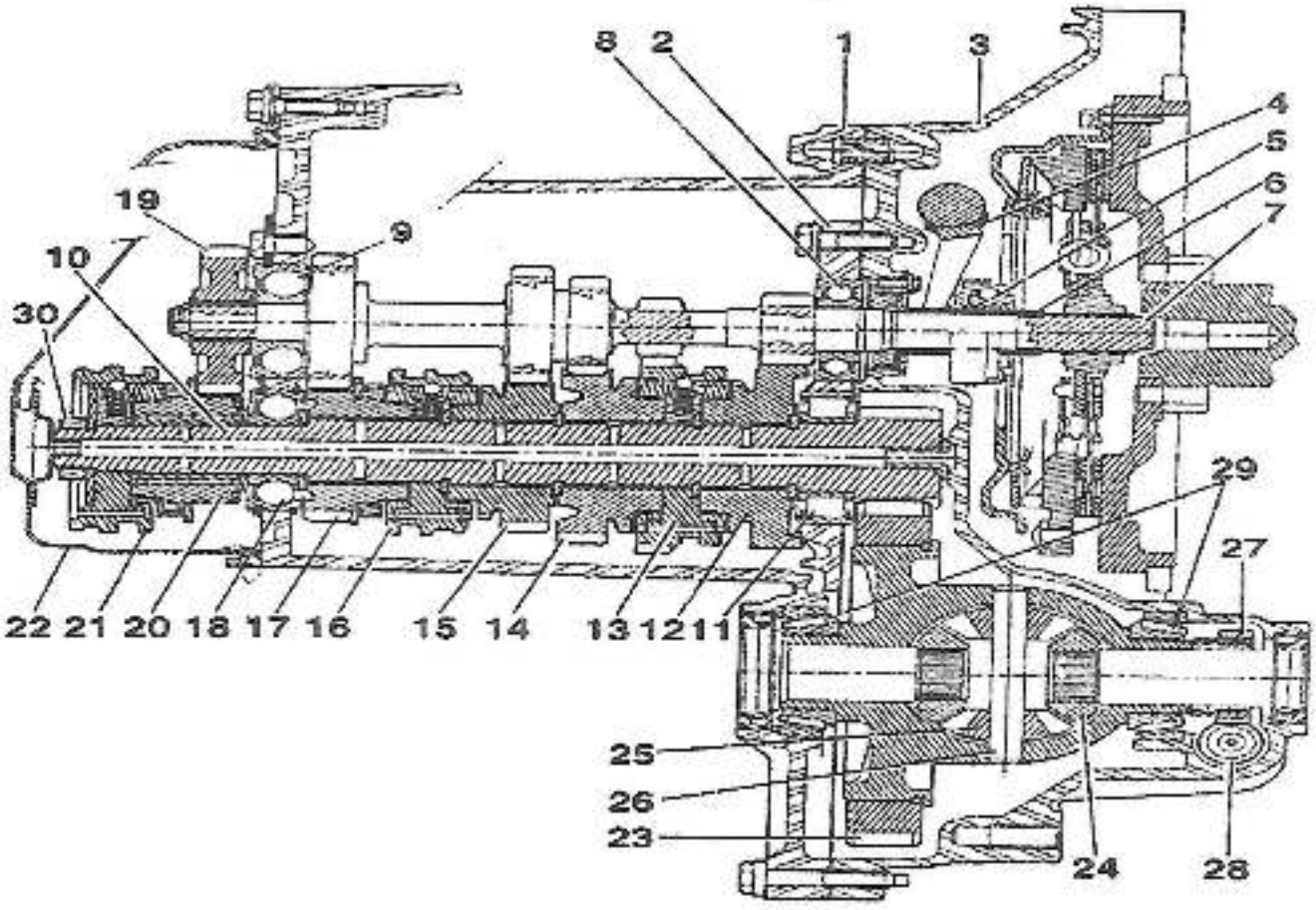


Figure 4

IV.1.1 Use blue ink to show the chain of the power drive from the gear box to the halve shafts when 5th gear is engaged. **(1mk)**

IV.1.2 Fill the table below with reference to the sketch on **figure 4.**

Ref.	**Name of part** (0,25×5=2,5mks)	**Functions** *(0,75×5=3,75mks)*
4		
5		
16		
23		
28		

IV.1.3 Give one reason which will enable you to conclude that the part '5' is worn. **(0,5mk)**

_____

_____

_____

IV.1.4 The driver of this vehicle complains to you that gear change is very difficult .State THREE possible causes of this fault. **(0,5×3=1,5mk)**

1._____

2._____

3._____

IV.2- BRAKES. (7.5mks)

Figure 5 below shows the outline of a car braking system.

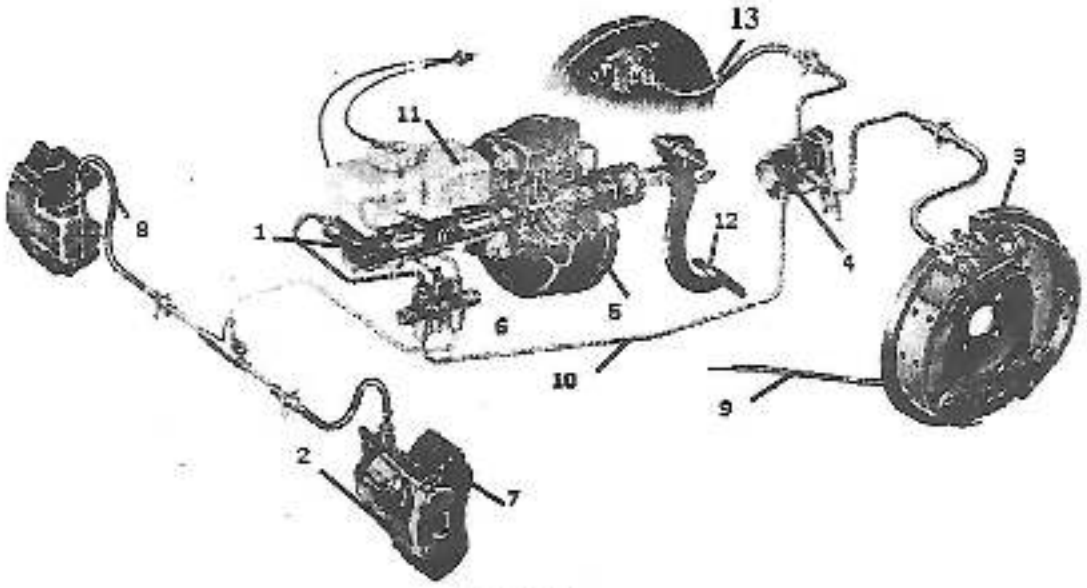


Figure 5

IV.2.1 Fill the table below with reference to figure 5. **(4mks)**

Ref.	Name of part *(0,25×4=1mk)*	Functions *(0,75×4=3mks)*
1		
3		
4		

IV.2.2 For each of the following faults, state ONE major cause **(1×2=2mks)**

Very weak pedal: _____

_____

Blocked rear wheels : _____

_____

IV.2.3 Explain the procedure used to bleed this type of brakes. **(1.5mks)**

_____

_____

_____