CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD	SUBJECT CODE NUMBER **MA-6104**	SERIES/SPECIALTY **Automobile Repair Mechanics (MA)**
Examination **Probatoire de Brevet de Technicien Examinations**	SUBJECT TITLE **Electrical and Electronic Technology**	
Date of Examination **Wednesday 25 May 2016**	SESSION **JUNE 2016**	
TYPE OF EXAMINATION **WRITTEN**		

Duration* : *14:00 – 17:00
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

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PROBATOIRE DE BT
Session : _____
Series : MA
Time : 3 hours
Coefficient : 03
Written Paper

ELECTRICAL AND ELECTRONIC TECHNOLOGY

AUTHORISED DOCUMENTS
No document, apart from those given by the examiners is authorised.
This paper is comprised of pages 1/8 to 8/8.

This paper carries 60 marks.
It has FOUR independent sections as follows:

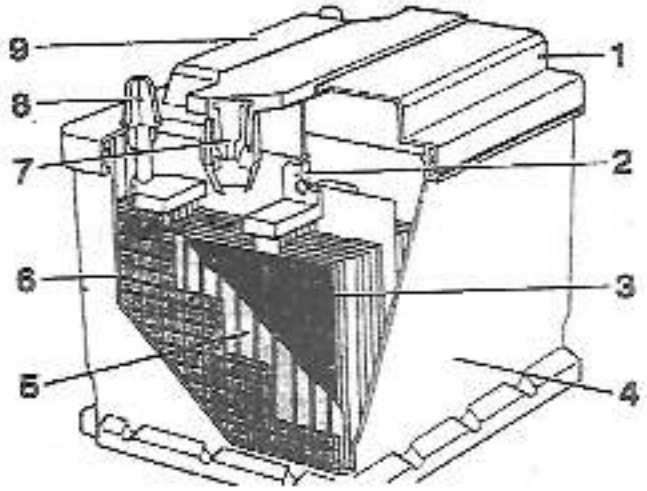
- **LEAD ACID BATTERY** (14 Mks)
- **IGNITION SYSTEM** (21 Mks)
- **CHARGING SYSTEM** (14 Mks)
- **AUTOMOBILE ELECTRICAL ACCESSORY CIRCUITS** (11 Mks)

SECTION I: LEAD ACID BATTERY

I.1. What is the function of the lead acid battery in the motor vehicle ?

_____
_____
_____ (1mk)

I.2. Below is a cut away view of a lead acid battery.



a. Give the names and functions of the parts as shown in the table below ;

Ref.	Names (0,5 x 5=2,5mks)	Functions (0,5 x 5 = 2,5 mks)
2		
4		
5		
7		
8		

I.3.a. Name the instrument used to check the specific gravity of battery electrolyte

_____ **(1mk)**

I.3.b. Briefly describe how this specific gravity check is done.

_____

_____

_____

_____

_____ **(2 mks)**

I.3.c.What other check will you make if the specific gravity is found to be1,15 ?

_____

_____ **(1mk)**

I.4. Why is not allowed to smoke in the vicinity of a battery undergoing recharge?

_____

_____

_____ **(2mks)**

I.5. Why do you think an inactive battery (in an open circuit), discharges whereas it is not supplying any electric current?

_____

_____

_____

_____

_____

_____ **(2mks)**

SECTION II : IGNITION SYSTEM

II.1. Conventional ignition systems have been replaced by electronic ignition systems due to the many disadvantages of the latter. Name FOUR of these disadvantages.

_____

_____

_____

_____

_____

_____ **(0,5 x 4 = 2 mks)**

II.2. State FOUR consequences on engine performance of a very large Dwell Angle ?

(2 Pts)

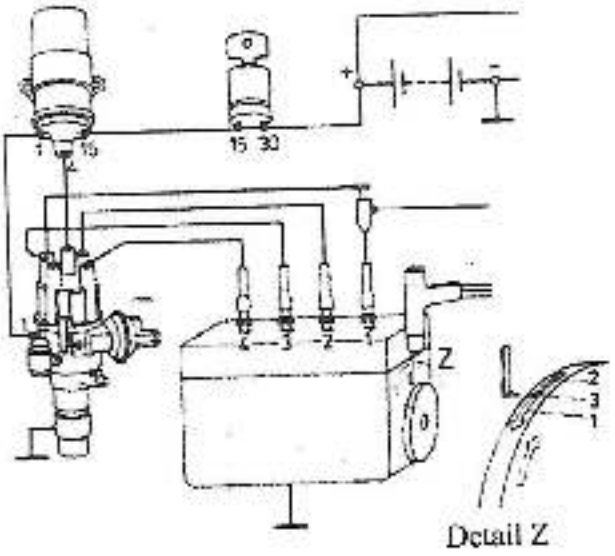
II.3. Can the Ignition coil of a transistorised ignition system be replaced with an ignition coil of the conventional type? (1mk)

Justify your answer:

(1mk)

II.4. You are to carry out ignition timing with the engine running:

a. Complete the diagram below by connecting up the stroboscopic timing lamp. (3mks)



Detail Z

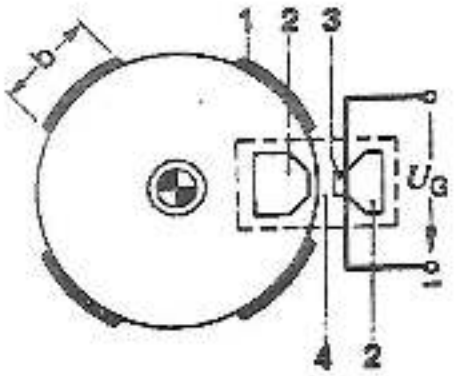
b. Briefly describe the method of timing

(3mks)

II.5. The partial diagram below is that of electronic ignition system:

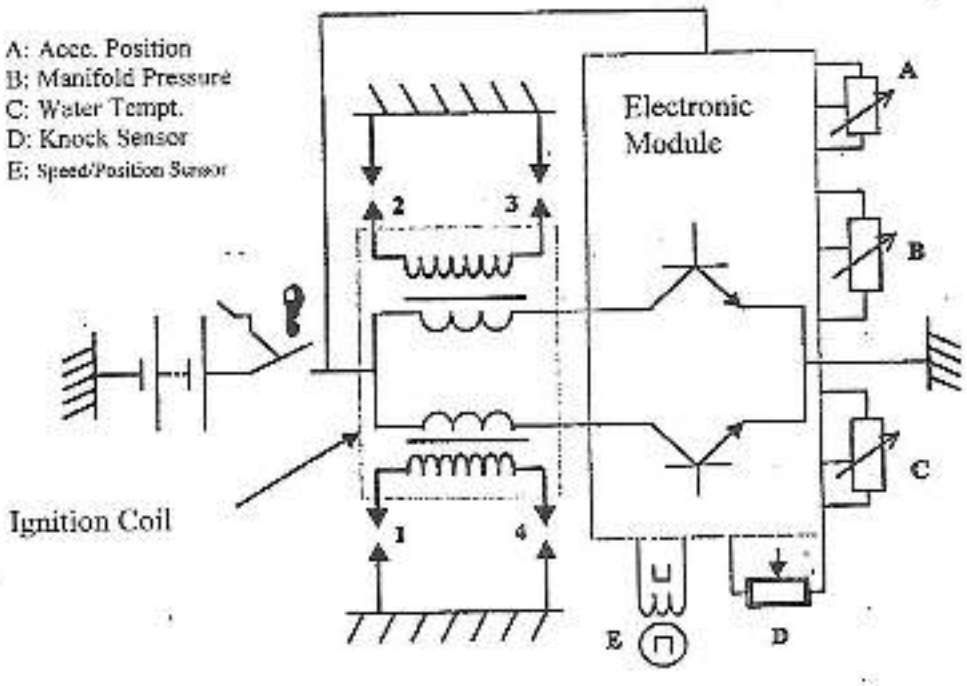
a) Of what type is it? _____ (1mk)

b) With the help of the diagram, fill the table below in order to name the parts.



N°	Name of part (0,5 x 6 = 3mks)
1	
2	
3	
4	
b	
U_G	

II.6. The diagram below is that of a fully integrated electronic ignition system.



a. Explain its principle of operation.

(4 mks)

b. State TWO advantages of the fully integrated electronic ignition system.

(1mk)

SECTION III : CHARGING SYSTEMS

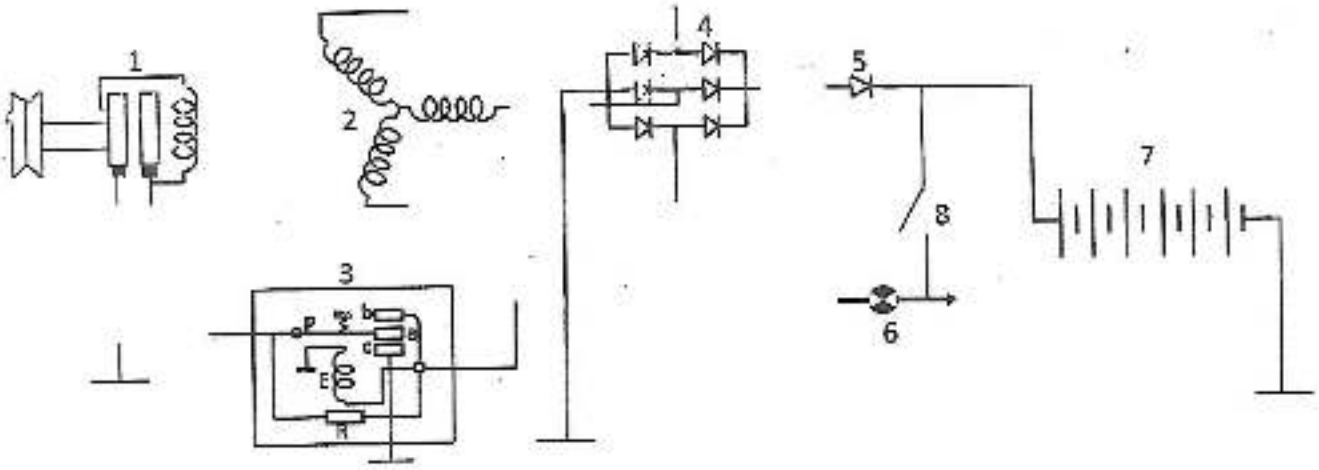
III.1. Name FOUR main components of a charging system

(2mks)

III.2. State the meaning of the following indications inscribed on the terminals of an alternator.

Indications	Meaning (0,5 x 5 = 2,5 mks)
N	
B	
F	
1	
2	

III.3.a. Complete the charging system diagram below so that it should be operational. (4mks)



III.3.b. Fill the table below ;

Ref.	Names (0,5 x 5 = 2,5mks)	Functions (0,5 x 5 = 2,5mks)
1		
2		
3		
5		
6		

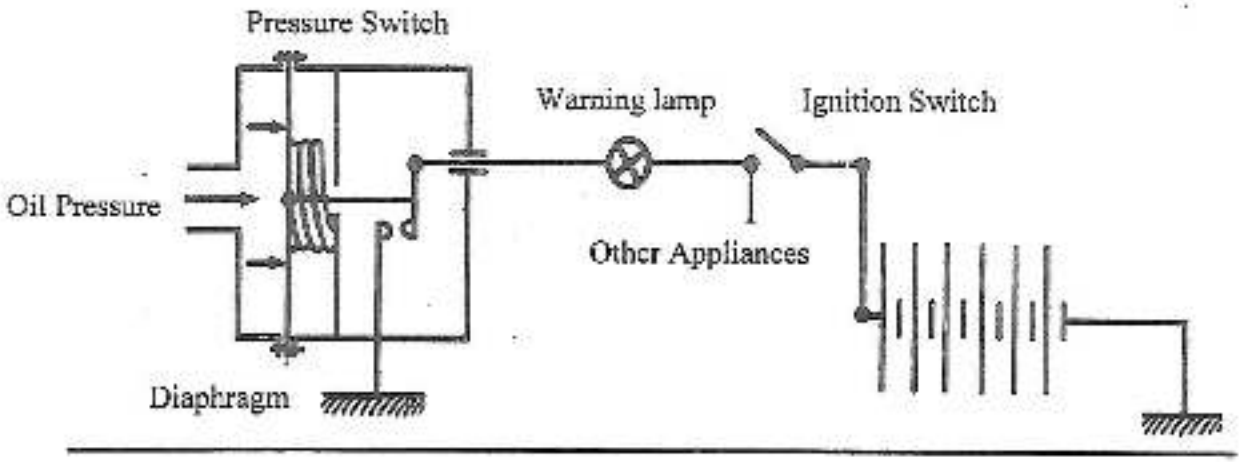
III.3.c. What does it indicate if the part numbered (6) remains constantly lit when the engine is running? _____

_____ (0,5mk)

_____

SECTION IV: • AUTOMOBILE ELECTRICAL ACCESSORY CIRCUITS

Lubricating oil pressure indicator circuit



You are owner of a garage, a customer announces you that the oil pressure warning lamp remains lit in the dashboard of his vehicle of mark PEUGEOT 306 after the engine is started.

1. While referring to the figure above, state three principal causes of this. **(0,5x3=1,5mk)**

a. _____

b. _____

c. _____

2. Give TWO major consequences on engine performance of a faulty lubrication system.

a. _____

_____ **(0.5mk)**

b. _____

_____ **(0.5mk)**

3. State three precautions to be observed, in order to prevent failure of the lubrication system.

_____

_____

_____

_____

_____

_____

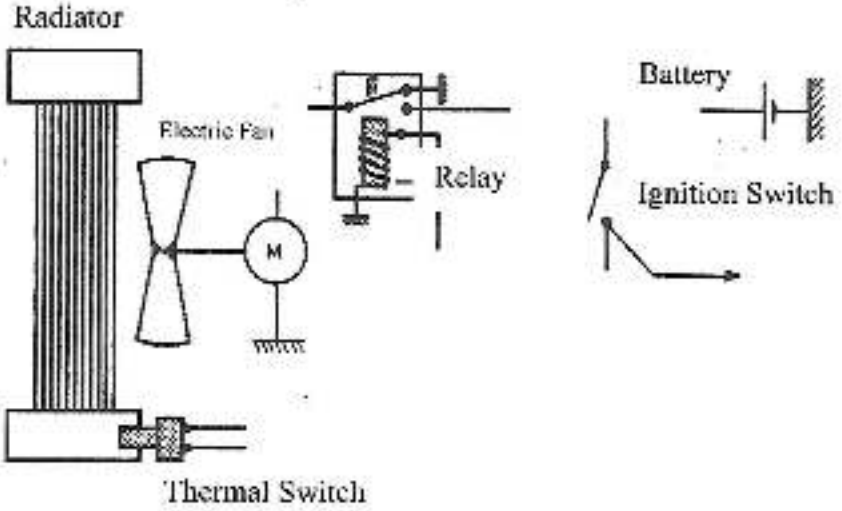
_____

(0.5x 3 = 1,5 mks)

Cooling systems

4. Current vehicles are equipped with cooling systems and electric fans operated by a thermal switch playing the role of temperature stabilizer and comes on only when it is necessary.

The sketch below shows an incomplete wiring diagram of the system.



4. a. Complete the diagram so that it should be operational. **(4mks)**

4. b. You wish to replace the relay with a PNP transistor, complete the diagram and conveniently fit the transistor in the circuit. **(3mks)**