



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
SEPTEMBER 2013 SESSION**

SUBJECT CODE : FVD 23104
SUBJECT TITLE : ENGINE MANAGEMENT SYSTEM
LEVEL : DIPLOMA
TIME / DURATION : / 3 HOURS
DATE :

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on ONE side of the paper.
3. Please write your answers on the answer booklet provided.
4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
5. This question paper consists of TWO (2) sections. Section A and B. Answer all questions in Section A. For Section B, answer TWO (2) questions only.
6. Answer all questions in English.

THERE ARE 4 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)**INSTRUCTION: Answer ALL questions.****Question 1**

The ignition timing is calculated as

$$\text{Ignition timing} = \text{Initial advance} + \text{Basic advance} + \text{Correction advance}$$

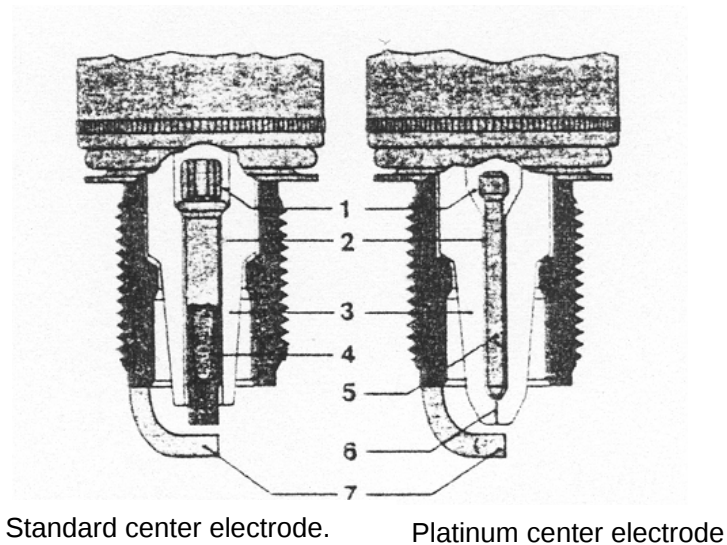
Explain the following terms:

- i. Initial Advance
- ii. Basic Advance and
- iii. Correction Advance.

(15 marks)

Question 2

Name the numbered components of typical spark plug in figure 1.

**Figure 1:** Two type of spark plugs.

(7 marks)

Question 3

Under normal combustion conditions the flame starts at the spark plug and propagates smoothly across the combustion chamber until the air-fuel mixture is completely burned. However, under some circumstances abnormal combustion can occur, resulting in engine inefficiency and possible damage. Explain two (2) most commonly encountered types of abnormal combustion.

(18 marks)

Question 4

Based on figure 2, present the operation of oxygen sensor (zirconia type)

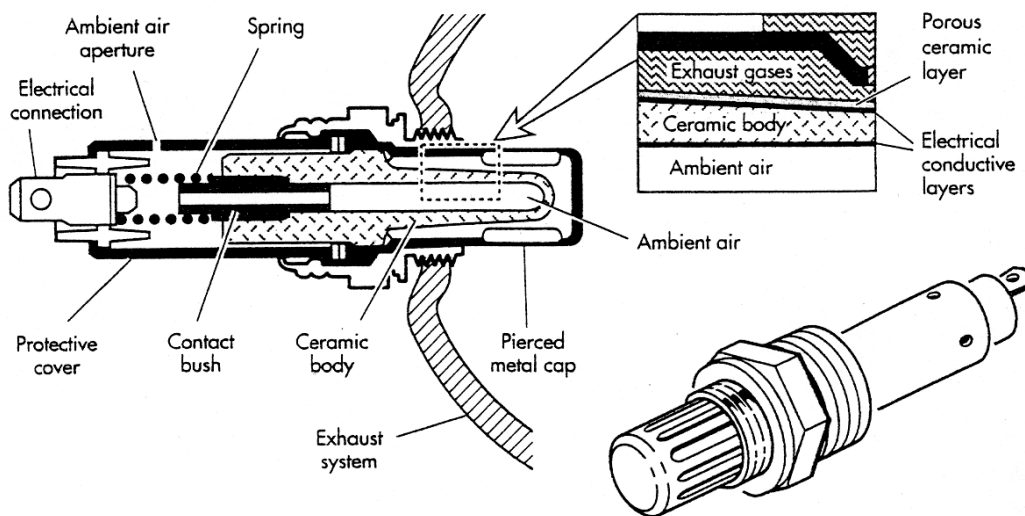


Figure 2: Cross-section of oxygen sensor

(10 marks)

Question 5

Based on the figure 3, show how the cooling fan relay works.

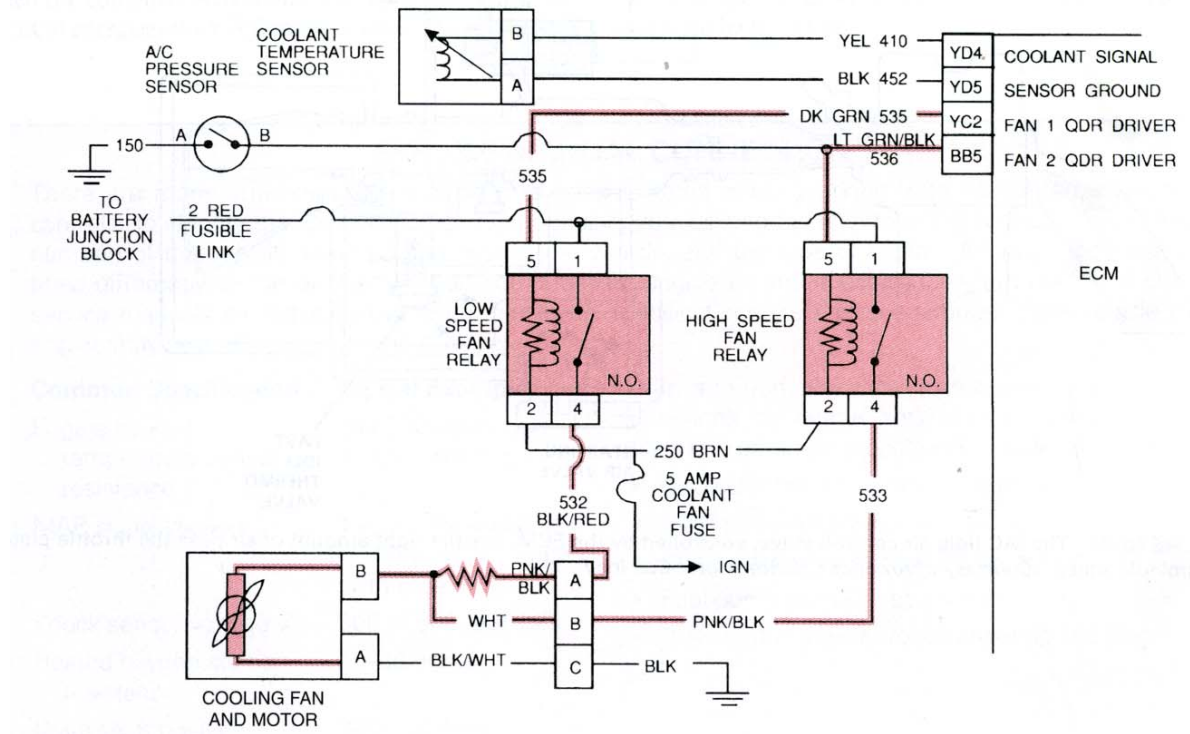


Figure 3: Control fan motor speed circuit

(10 marks)

SECTION B (Total: 40 marks)

INSTRUCTION: INSTRUCTION: Answer ONLY TWO (2) questions in this section.

Question 1

Explain FIVE (5) factors which influence the speed of flame propagation.

(20 marks)

Question 2

Explain "Speed Density EFI" and "Mass Air-Flow EFI".

(20 marks)

Question 3

Explain the operation of Three-Way Catalytic (TWC) converters.

(20 marks)

END OF QUESTION