



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION

JANUARY 2014 SESSION

SUBJECT CODE : FVD11804

SUBJECT TITLE : ENGINE MANAGEMENT & CONTROL TECHNOLOGY1

LEVEL : BACHELOR

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 **THREE (3)** questions only.
6. Answer all questions in **English**.

THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (TOTAL: 40 MARKS)**INSTRUCTION: Answer ALL questions.****Question 1**

Discuss the difference between mechanical engine control and computerized engine control.
(5 marks)

Question 2

Present the **FIVE (5)** major types of sensors used to gather inputs on a computerized engine control system.
(5 marks)

Question 3

Describe the **THREE (3)** common types of actuator that are used in engine management and control system. Give the example of actuator for each type.
(5 marks)

Question 4

By referring to Figure 1 below, interpret the circumstances of ignition timing at 50° BTDC
(5 marks)

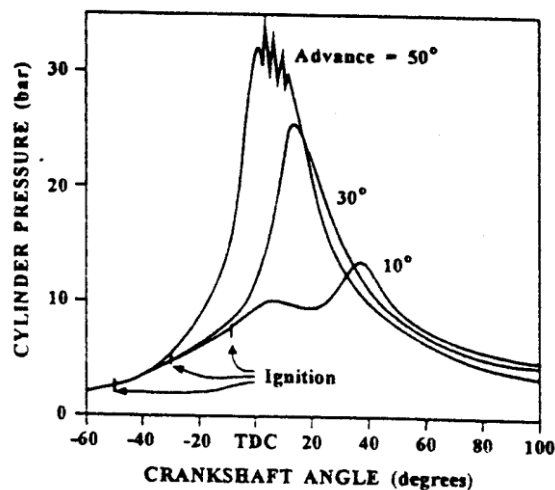


Figure 1: Cylinder pressure as a function of crankshaft angle in a typical engine.

Question 5

With an aid of diagram, explain the current flow of fuel pump DC motor as well as describe the function of fuel pump DC motor.

(5 marks)

Question 6

Describe the probable causes of Throttle Position Sensor (TPS) when the voltage signal at idle position ON is:

- ✓ Equal 0.2 or less
- ✓ Equal 0.2 or more

(5 marks)

Question 7

After done troubleshooting, it's found that the injectors do not operate for a continuous approximately 5 second period while engine is cranking or idling. Describe the effects of this problem to the engine performance.

(5 marks)

Question 8

One of the engine problem symptoms during driving is hesitation sag. Define the hesitation sag.

(5 marks)

SECTION B (TOTAL: 60 MARKS)

INSTRUCTION: Answer ONLY THREE (3) questions this section.

Question 1

The three (3) way catalytic converter is a vehicle emissions control device that converts toxic pollutants in exhaust gas to less toxic pollutants where it is used in internal combustion engines fueled by petrol or diesel engines. Describe the catalyzing reaction according to:

- i. Oxidation process
(10 marks)
- ii. Reduction process
(10 marks)

Question 2

Nowadays there is numerous computerized engine controls system which is used in internal combustion engines (ICE). With an aid of the diagrams (e.g. schematic layout) explain the types of:

- i. Speed Density EFI and
(10 marks)
- ii. Mass Air-Flow EFI
(10 marks)

Question 3

Explain the work methods of how to perform inspection of injector by:

- i. Using cope meter. (Illustrate your answer by sketching the injector wave form for support you answer)
(15 marks)
- ii. Manually.
(5 marks)

Question 4

- i. The ignition timing is calculated as

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

Explain the following terms:

- a. Initial Advance
- b. Basic Advance and
- c. Correction Advance.

(15 marks)

- ii. The Exhaust Gas Recirculation (EGR) system is designed to reduce the amount of NO_x created by the engine during operating periods. With an aid of diagram, describe how the system can reduce the Oxides of Nitrogen (NO_x).

(5 marks)

Question 5

Fuel system failure contributes to bad emission, engine poor performance as well as increase fuel consumption. Explain the work methods on how to perform fuel system line test by using fuel pressure gauge. Provide the specific pressure readings to support your answer.

(20 marks)

Question 6

In Throttle body assembly has air bypass circuit system such as:

- i. Fast idle air valve

(10 marks)

- ii. Idle Speed Control (ISC)

(10 marks)

With an aid of diagram, explain the operations of circuit system of i. and ii. above.

END OF QUESTION