



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
SEPTEMBER 2013 SESSION**

SUBJECT CODE	:	FVB 30203
SUBJECT TITLE	:	ENGINE MANAGEMENT AND CONTROL TECHNOLOGY 2
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 both sides 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) question only.
 6. Answer all questions in English.
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THERE ARE 3 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)**INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

There are two stages of ECU calibration used in automotive industries. Explain both of them in terms of the objective and five examples of calibration works for each stage.

(12 marks)

Question 2

There are two types of architectures of ECU, 16-bit load based and 32-bit torque based. Explain in detail the metering system used in 16 bit load based ECU.

(12 marks)

Question 3

Draw a table for injection and ignition timing phase for 3-cylinder 4-stroke cycle engine.

(5 marks)

Question 4

The mechanical efficiency of a single-cylinder four-stroke engine is 80%. The frictional power is estimated to be 25 kW. Calculate the indicated power (ip) and brake power (bp) developed by the engine.

(5 marks)

Question 5

Draw a comparison table for the effect of spark advance and retard in respect to

- i. pressure in cylinder,
- ii. engine power,
- iii. knocking,
- iv. exhaust temperature,
- v. Fuel.

(6 marks)

SECTION B (Total: 60 marks)

INSTRUCTION: Answer only THREE questions.

Please use the answer booklet provided.

Question 6

You are given a vehicle proton persona CamPro IAFM wiring diagram to be tuned by using a MOTEC system. You are required

- a. To list down all sensor and actuator available on the vehicle.
- b. To draw and rewiring the complete wiring diagram based on the PROTON persona 1.6 I that use MOTEC ECU.
 - i. State all sensor connection point and termination.
 - ii. State the name of the sensors.
 - iii. State all actuator connection point and termination.
 - iv. State the name of all actuator.

(20 marks)

Question 7

You are given a vehicle proton persona CamPro IAFM wiring diagram to be tuned by using a MOTEC system. You are required

- a. To list down all sensor and actuator available on the vehicle.
- b. To draw the power line of:
 1. 12 volt system
 2. 8 volt system
 3. 5 volt system
- c. To draw and state the starting system layout and name all the connection point.
- d. To draw and state the ignition system layout and name all the connection point.
- e. To draw and state the fuel pump system layout and name all the connection point.

(20 marks)

Question 8

You are given a vehicle proton persona CamPro IAFM to be tuned by using a MOTEC system. You are required to develop a calibration procedure using a MOTEC software system. Your calibration procedure should include the following items:

- a. ECU input and output checks
 - i. Engine parameters
 - ii. Crank and cam synchronization
 - iii. Sensor calibration:
 - a. Throttle Position Angle
 - b. Input sensors
 - c. MAP sensor calibration
 - d. Air temp sensor
 - e. Engine temp
 - f. Lambda sensor
 - g. Exhaust temp

(20 marks)

Question 9

You are given a vehicle proton persona CamPro IAFM to be tuned using a MOTEC system. You are required to develop a calibration procedure using a MOTEC software system. Your calibration procedure should include the following items:

- a. Spark and fuel calibration for Part load and full load
 - i. Ignition angle Map
 - ii. Fuel Injection Map
 - iii. Part Load Ignition and Fuel Calibration procedure for Maximum spark advance for best torque (MBT)
 - iv. Full Load Ignition and Fuel Calibration procedure for fuel saving
 - v. Full Load Ignition and Fuel Calibration procedure for performance.
- b. Lambda controller
 - i. Base lambda table values

(20 marks)

END OF QUESTION