



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
SEPTEMBER 2014 SESSION**

SUBJECT CODE : FVB30803
SUBJECT TITLE : ALTERNATIVE FUEL VEHICLE
LEVEL : BACHELOR
TIME / DURATION : 9.00 AM – 11.30 AM
(2.5 HOURS)
DATE : 31 DECEMBER 2014

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 4 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)**INSTRUCTION: Answer all the question.****Question 1**

- (a) State **FIVE (5)** requirement that need to be considered during installation of the ***cylinder bracket*** to vehicle as required by Malaysian Standard code of practice for the use of CNG in Internal Combustion Engines.
(10 marks)
- (b) As an authorized officer, you are carrying out an inspection prior to issuing a 'periodic inspection certificate'. List down the checks that need to be carried out on the following components:
i. Regulator
ii. Fuel line
(5 marks)
- (c) Explain what are the correct safety procedures need to be taken if a major leak on the NGV fuel system is detected.
(3 marks)
- (d) In its pure state Natural Gas is tasteless, colorless and odorless. Explain is it odorized when used as a vehicle fuel.
(2 marks)

Question 2

- (a) Explain clearly the operation of the NGV Sequential System as a bi-fuel vehicle. Support your answer by illustrating a diagram.
(10 marks)
- (b) Explain the functions of the NGV regulator component.
(2 marks)

- (c) Explain clearly **TWO (2)** procedures in installing the master shut off valve. (4 marks)
- (d) Give **TWO (2)** reasons why does the ignition timing of a bi-fuel (NGV and Gasoline) vehicle has to be set more advanced than the original setting. (4 marks)

SECTION B (Total: 60 marks)

INSTRUCTION: Answer THREE (3) questions only.

Question 3

- (a) Explain clearly the differences between dedicated fuel, dual fuel and bi-fuel type of CNG. (12 marks)
- (b) Explain the reasons why NGV is a better fuel than gasoline for the following aspects:
- i. Safety
 - ii. Economy
- (8 marks)

Question 4

- (a) Explain the reasons why using Hybrid Electric Vehicle is more reliable compared to Gasoline Vehicle in terms of their efficiency. (8 marks)
- (b) Explain the Hybrid Electric Vehicle with series-parallel type of system. Support your answer with a sketch of diagram. (12 marks)

Question 5

- (a) There is one customer asking for your advice whether it is worth to install NGV system to his vehicle. He is actually driving from Bangi to Rawang which is about 100 km distance.
- i) Calculate the expenses on using the petrol
 - ii) Calculate the expenses on using the CNG
 - iii) Determine the profit that he will earn
 - iv) If he would like to install the CNG, calculate the costing for the installation. (8 marks)
- (b) List down a detail inspection to a vehicle before installing the NGV system and explain why is it needed to do it? (8 marks)
- (c) List **FOUR (4)** difference between NGV sequential system and NGV mixer system. (4 marks)

Question 6

(a) Describe the troubleshooting for the following malfunctions on NGV bi-fuel vehicle.

i. Engine runs on CNG when rpm is over than 1500 rpm, but dies off during idling.

ii. Engine runs on gasoline, but not on CNG.

(10 marks)

(b) Explain the differences between Medium Hybrid and Fully Hybrid.

(10 marks)

END OF QUESTION