UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2014 SESSION

SUBJECT CODE	:	**FVB 20803**
SUBJECT TITLE	:	**CHASSIS 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 inEnglish.

THERE ARE 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer the entire question.
Please use the answer booklet provided.

Question 1
List down **Four (4)** different between *Emergency Braking Assistant* and *Traditional Braking*.

(8 marks)

Question 2
Explain the advantage of Electronic Brake Distribution (EBD) compared to conventional braking system?

(6 marks)

Question 3
Explain in details how does EBD function.

(10 marks)

Question 4
Name all the component of EBD system

(4 marks)

Question 5
Figure 1 shows the change in pressure in a front calliper as a function of time and the force exerted by the driver on the brake pedal when emergency braking. Write down the changes happen in pressure and force exerted in *Zone A*, *Zone B* and *Zone C*.
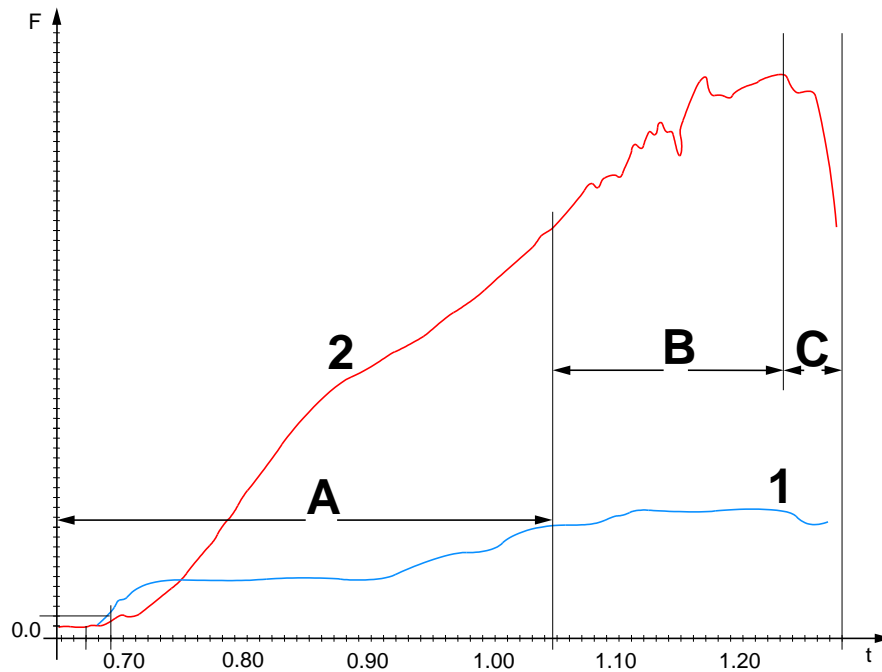
(6 marks)

Figure 1: Analysis of the Driver's Behaviour upon Emergency Braking

t : Time in seconds

Line No. 1 : Change in force from driver

Line No. 2 : Change in pressure in a front calliper

Zone : A,B and C

Question 6

List down **Three (3)** main features of the suspension system.

(6 marks)

SECTION B (Total: 60 marks)

INSTRUCTION: Answer Three (3) questions only.
Please use the answer booklet provided.

Question 7

A driver applies 350 N of force to a brake pedal that is connected to the master cylinder through a brake pedal lever having 4:1 ratio. The master cylinder piston has a diameter of 20mm. By referring to the **Figure 2**:
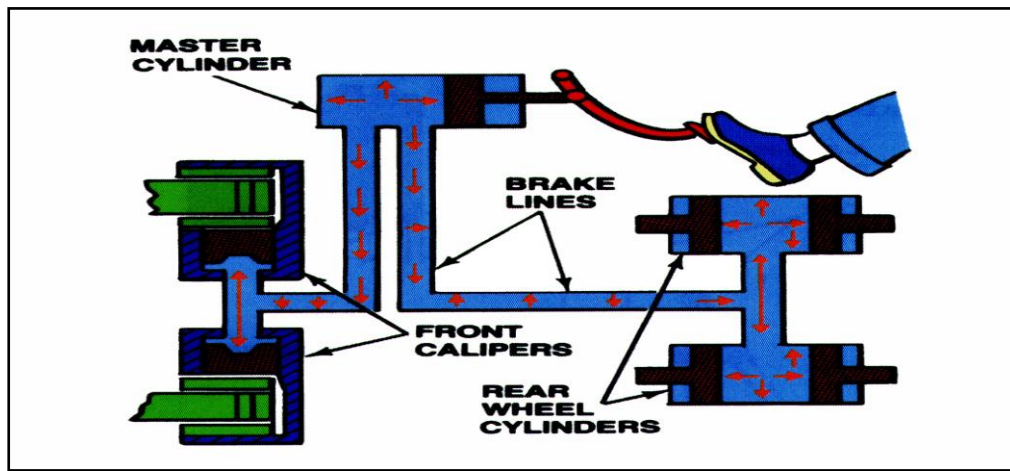

Figure 2: Brake System Layout

a)   Calculate the force that is being applied to the master cylinder piston?

(5 marks)

b)   Calculate the pressure that is generated in the braking system?

(5 marks)

c)   Find the force that is produced by a 30mm diameter wheel cylinder.

(5 marks)

d)   Find the pressure that has been generated in the braking system if the system uses the Emergency Valve Assistant.

(5 marks)

Question 8

a) **Figure 3** shows the layout of the Antilock Braking System (ABS) when the system is in normal braking position.
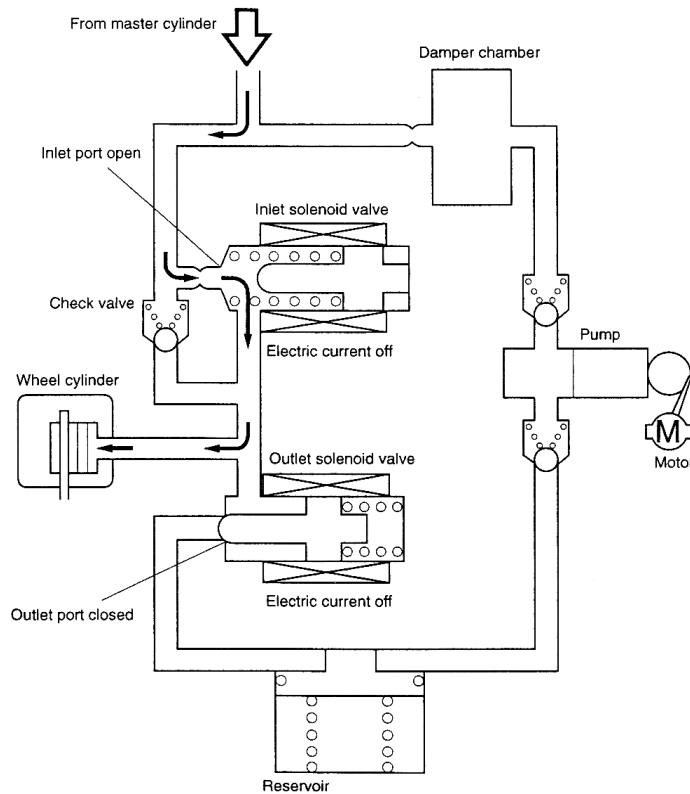

Figure 3: Normal braking position

By referring to the **Figure 3**,

i)   Sketch in separate layout during 'pressure dump' and 'pressure increase' position the flow of braking fluid.

(8 marks)

b)   Discuss and state down **Two (2)** reasons why Electronic Stability Program (ESP) is more efficient than Anti-lock Braking System (ABS) system.

(4 marks)

c)   The aim of Electronic Stability Programme (ESP) is to prevent the vehicle becoming unstable by braking each wheel independently to the others. Explain with an aid of diagram, how the Electronic Stability Programme (ESP) function can prevent the vehicle from **understeer** situation.

(8 Marks)

Question 9

If the mass of the vehicle is 900kg and is equally balance on all suspension, calculate:

Table 1: Classification of Suspension comfort Rating

Frequency (Hz)	Suspension quality
0.5 to 1.0	Soft, very comfortable
1.0 to 1.3	Firm, quite comfortable
1.3 to 1.5	Hard, comfortable
Over 1.5	Very hard and uncomfortable

a)   The stiffness (K) on each suspension if the static deflection of the loaded spring is 10cm,

(6 marks)

b)   The stiffness (K) on each suspension if the static deflection of the loaded spring is 25cm,

(6 marks)

c)   The frequency generated by using the stiffness (K) value from Question 9a.

(3 marks)

d)   The frequency generated by using the stiffness (K) value from Question 9b

(3 marks)

e)   From the **Table 1**, determine the suspension qualities for both deflection values.

(2 marks)

Question 10

a) List down **Four (4)** advantages if the Hydraulic Power Steering system is to be replaced by Electric Power Steering system from the view of the **manufacturer's and environmental** perspective.

(4 marks)

b) State down **Four (4)** differences between Fully Electric Power Steering Systems with Electrical Hybrid Steering System.

(8 marks)

c) Motor Driven Power Steering Control Module (MDPSCM) has 4 main inputs. List down and explain the use of the input you have listed.

(4 marks)

d) Explain **Two (2)** safety precaution taken for electrical power steering ECU if:-

    a. If a sensor or other component in the EPS system fails

(2 marks)

    b. If the electrical power steering motor is overheating

(2 marks)

END OF QUESTION