



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
SEPTEMBER 2014 SESSION**

SUBJECT CODE : FVB20803
SUBJECT TITLE : CHASSIS TECHNOLOGY 2
LEVEL : BACHELOR
TIME / DURATION : 3.30 PM – 6.00 PM
(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 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer the entire question.

Question 1

Explain in detail how does EBD function.

(10 marks)

Question 2

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)

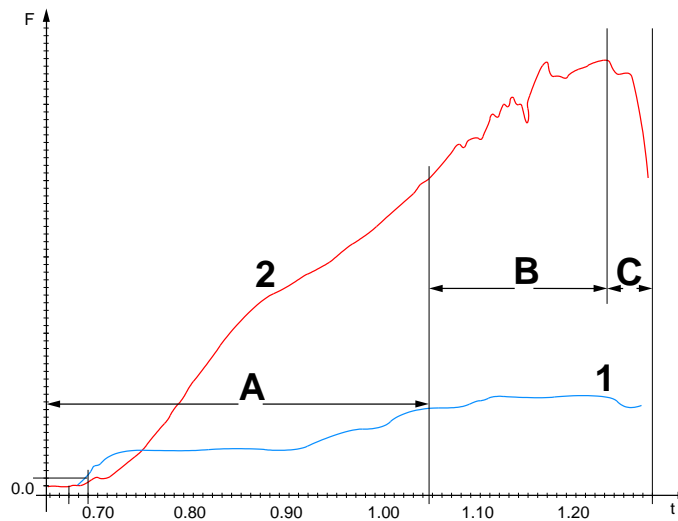


Figure 1: Analysis of the Driver's Behaviour upon Emergency Braking

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 3

List down four **(4)** differences between *Emergency Braking Assistant* and *Traditional Braking*.

(8 marks)

Question 4

List all the component of EBD system

(4 marks)

Question 5

Explain the advantages of Electronic Brake Distribution (EBD) if compared to conventional braking system.

(6 marks)

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.

Question 7

Below is the diagram of Emergency Valve Assistant + Master Cylinder.

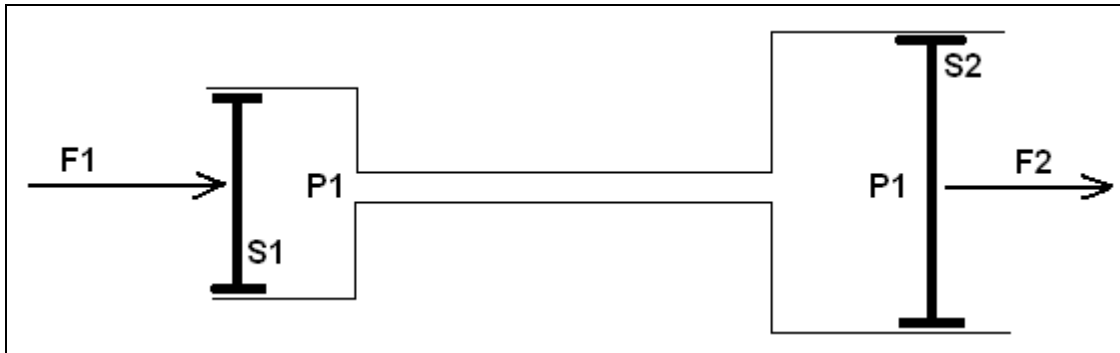


Figure 2: Emergency Valve Assistant + Master Cylinder

- i). Calculate the pressure of P1, if the applying force is 10kgf (100 N) and surface area of S1 is 2 cm². (5marks)

- ii). Calculate the force of F2 if the surface area of S2 is 10cm²? (5marks)

- iii). If the given surface area of S1 = 1 cm² and surface area of S2 = 20 cm², give the best theoretical explanation? (10marks)

Question 8

The table below shows some examples of coefficients of adherence depending on the type of road surface and the condition of the tyres.

Table 1: Coefficient of adherence

Value of coefficient of adherence	Dry road	Wet road	Puddle	Ice
New tyres	0.85	0.65	0.5	0.1
Worn tyres	1	0.5	0.25	0.1

The speed of the vehicle is 150 kph

i). Calculate the Velocity (m/s).

(5marks)

ii). Determine the stopping distance using new tyre at Dry road and Wet road.

(8marks)

iii). From the calculation on Q8 (ii), give the best conclusions.

(7marks)

Question 9

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

Table 2: 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

- i) The stiffness (K) on each suspension if the static deflection of the loaded spring is 10cm. (6 marks)
- ii) The stiffness (K) on each suspension if the static deflection of the loaded spring is 25cm. (6 marks)
- iii) The frequency generated by using the stiffness (K) value from Question 9a. (3 marks)
- iv) The frequency generated by using the stiffness (K) value from Question 9b. (3 marks)
- B. 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 view of the **manufacturer's and environmental's** perspective.

(4 marks)

- b) State 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 uses of the input you have listed.

(4 marks)

- d) Explain two (2) safety precaution for electrical power steering ECU which will take action if:-

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

(2 marks)

- b. the electrical power steering motor overheats.

(2 marks)

END OF QUESTION