



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JULY 2010 SESSION

SUBJECT CODE : FVB 20303
SUBJECT TITLE : ADVANCE TRANSMISSION TECHNOLOGY
LEVEL : BACHELOR
TIME / DURATION : 9.00am – 12.00pm
(3 HOURS)
DATE : 10 NOVEMBER 2010

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 questions paper consists of FIVE (5) questions. Answer FOUR questions ONLY.
6. Answer all questions in English.

THERE ARE 5 PAGES OF QUESTIONS AND 1 PAGE OF APPENDIX, EXCLUDING THIS PAGE.

INSTRUCTION: Answer Only FOUR questions.

(Total: 100 marks)

Please use the answer booklet provided.

Question 1 (25 marks)

- (a) Why does the ATF (automatic transmission fluid) color change from red to brown? (3 marks)
- (b) By referring to figure 1 below, explain the vehicle condition for no. 1 until no. 8. (4 marks)

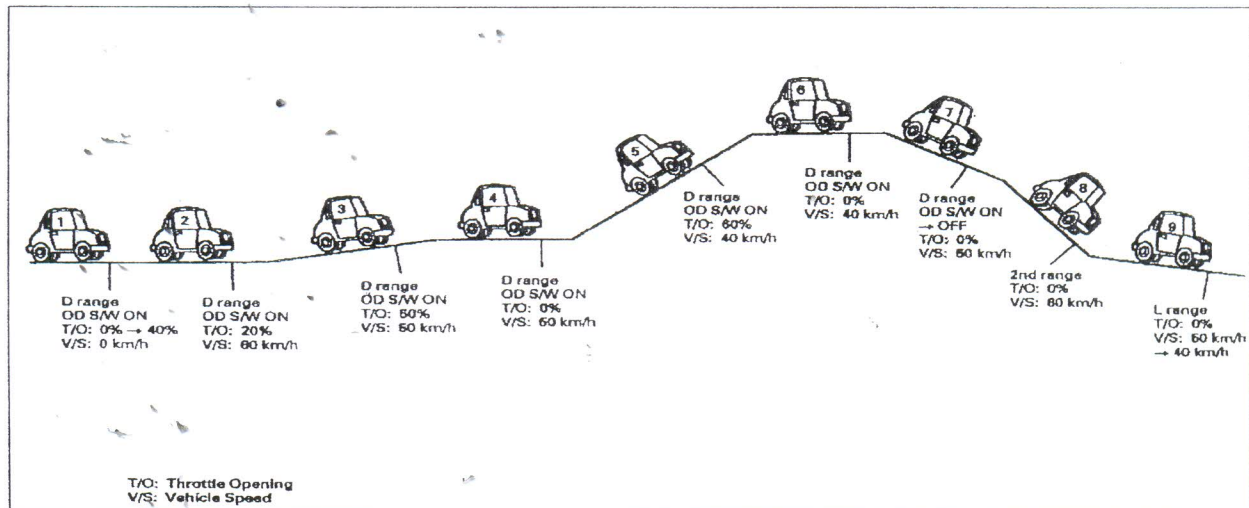


Figure 1: Vehicle running condition

- (c) What are the possible causes that may lead to deteriorations of automatic transmission fluid? (6 marks)
- (d) What is the safety mechanism that is usually equipped with an automatic transmission vehicle and clearly explains how does the system work? (12 marks)

Question 2 (25 marks)

- (a) What are the roles of the planetary gear unit? (3 marks)
- (b) Explain the operation of planetary gear sets during:
- Deceleration (5 marks)
 - Acceleration (5 marks)
- (c) List **SIX (6)** roles of hydraulic control system? (6 marks)
- (d) What is the rear clutch and explain how the power is transmitted. (6 marks)

Question 3 (25 marks)

- (a) After performed the converter stall test, the engine RPM reading that was obtained is not in specification in both D and R range. Explain the possible problems of the transmission.

Table 1: Transmission Stall Test

Type of Gearbox	Gear Position	Engine RPM
F3A21	D	High than standard value
	R	Low Than Standard Value
F4A22	D	Low Than Standard Value
	R	High than standard value

Question 5 (25 marks)

- (a) What do you understand about an automatic transmission? (6 marks)
- (b) List **THREE (3)** advantages of automatic transmission compared to the manual transmission. (6 marks)
- (c) List **THREE (3)** roles of torque converter. (3 marks)
- (d) What is the function of stator one-way clutch on these conditions:
 - i. while the vortex flow is large (4 marks)
 - ii. while the vortex flow is small (6 marks)

END OF QUESTION

APPENDIX

Condition in the Uniform Wear

1. The intensity of pressure

$$p = \frac{C}{r}$$

2. Total force acting on the friction surface

$$W = 2 \pi \times C \times (r_1 - r_2)$$

3. The frictional torque acting on the ring

$$T = \mu \times W \times R \quad \text{where } R = \frac{r_1 + r_2}{2}$$

Multiple Disc Clutch

1. Total frictional torque acting on the friction surfaces or on the clutch

$$T = n \times \mu \times W \times R$$

Pressure average

$$p_{av} = \frac{\text{Total normal force on contact surfaces}}{\text{Cross-sectional area of contact surfaces}}$$

Power transmitted

$$P = T \times \omega \text{ where } \omega \text{ is speed in rad/second}$$