



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
SEPTEMBER 2013 SESSION**

SUBJECT CODE : FVD 30202 / 24302
SUBJECT TITLE : TRANSMISSION 2
LEVEL : DIPLOMA
TIME / DURATION : 2.5 HOURS
DATE :

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
 2. This question paper is printed on one 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 two (2) questions only.
 7. Answer all questions in English
 8. All gear ratio formula is appended
 9. All question paper should be returned back to the invigilator
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THERE ARE 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)**INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

- a) List down **TWO** benefits of using transmission that is equipped with computer control shift pattern system.

(2 marks)

- b) Explain the denotation of "PWR or NORMAL" button that is located at the automatic gear selector mechanism of automatic transmission vehicle.

(5 marks)

- c) List down **THREE** possible causes of degradation of Automatic Transmission Fluid (ATF).

(3 marks)

- d) Determine the condition of the Automatic Transmission Fluid (ATF) when the fluid used was change into blackish color.

(5 marks)

- e) Explain the basic principle of torque converter operation that is used to transfer engine power to the transmission.

(5 marks)

Question 2

- a) Name **TWO** types of fluid flow within the torque converter that may occur during the process of transmitting power from engine to the transmission.
(2 marks)
- b) Draw the Simpson type planetary gear set and name the entire components of the gear set.
(3 marks)
- c) List down the mechanisms in KF4A gear box that control input to planetary and lock the planetary component while producing various gear ratios.
(5 marks)
- d) Describe the “Adjustable Type Check Valve” that is fitted in automatic transmission hydraulic system.
(5 marks)
- e) Explain the main functions of inhibitor switch that is install in automatic transmission.
(5 marks)

Question 3

- a) Explain the operation of Ravigneaux type planetary gear components when the shifts speed is in first gear.
(5 marks)
- b) Write down the correct procedures of performing the “torque converter stall test”.
(8 marks)
- c) In typical planetary gear set which is consists of planet pinion, sun gear (15 gear teeth), ring gear (45 gear teeth) and planet carrier. When the planet carrier acts as a driving member and sun gear is stationary held, determine the gear ratio and the direction of rotation of output member.
(7 marks)

SECTION B (Total: 40 marks)

INSTRUCTION: Answer TWO questions only.

Question 1

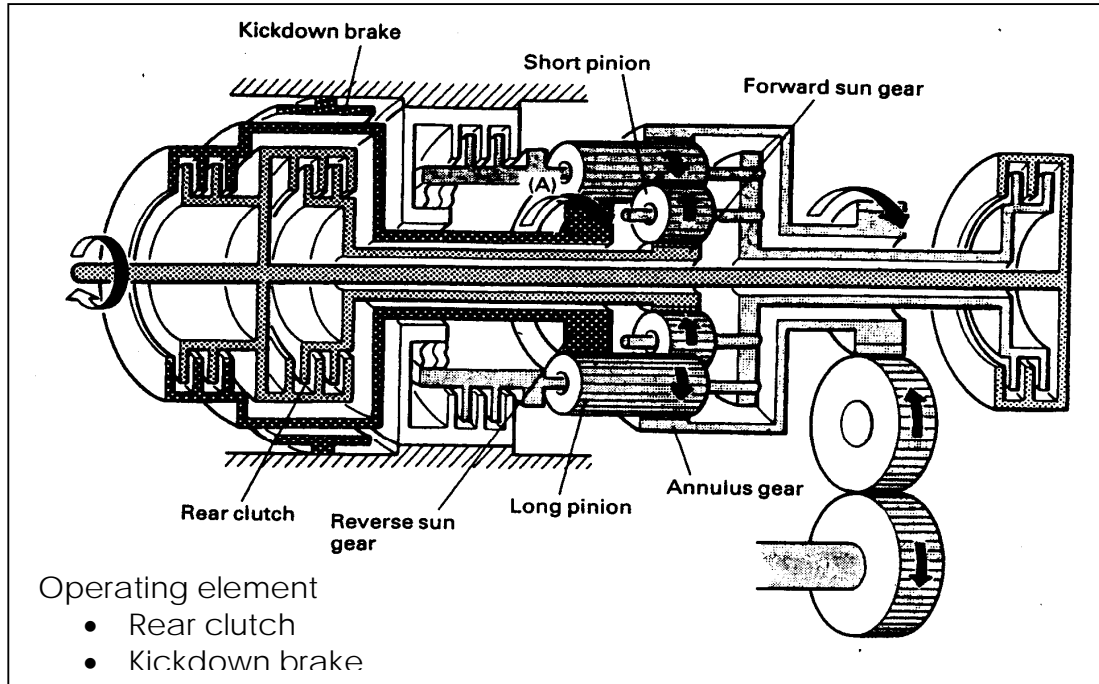


Figure 1: Operating Element in Typical Automatic Transmission

- a) By referring to figure 1, answer the questions below
- i) By referring the given operating element, determine the gear position that will be obtained. (2 marks)
 - ii) Explain the process of obtaining the above gear position. (4 marks)
 - iii) Calculate the gear ratio in figure 1 if the number of Annulus gear teeth is 74, forward sun gear is 26, reverse sun gear is 34, short pinion is 22 and long pinion is 20. (Refer to appendix for the suitable gear ratio formula). (4 marks)

- b) By referring to information that is given in **question 1 a) iii**), Calculate the output (wheel) speed of the vehicle and the maximum speed (k/mh) if the vehicle is running in constant engine speed of 3000RPM at **4th speed** with final drive ratio of 3.67:1 and using the tire that has outer diameter of 66.5cm

(10 marks)

Question 2

- a) A torque converter component will be splined/slotted to a three different shafts/components at the automatic transmission.

- i. Name the related torque converter components and which shafts/components that will be splined/slotted to the automatic transmission.

(3 marks)

- ii. What will happen to the automatic transmission operation if one of those splined/slotted components is malfunction?

(4 marks)

- iii. Give the suitable solution in order to overcome the problem.

(3 marks)

- b) Customer complained that his vehicle that uses automatic transmission (KF4A) has a problem when shifting to “**reverse**” and “**L**” position but the transmission worked satisfactorily in D position.

- i) What are the operating elements that operate in R and L position?

(5 marks)

- ii) Determine the possible causes of the above problem.

(5 marks)

Question 3

a) By referring to figure 2, answer the questions below

i) Name the entire parts that are numbered.

(5 marks)

ii) Determine the **position** of the torque converter clutch and clearly **explain** how the position was achieved.

(5 marks)

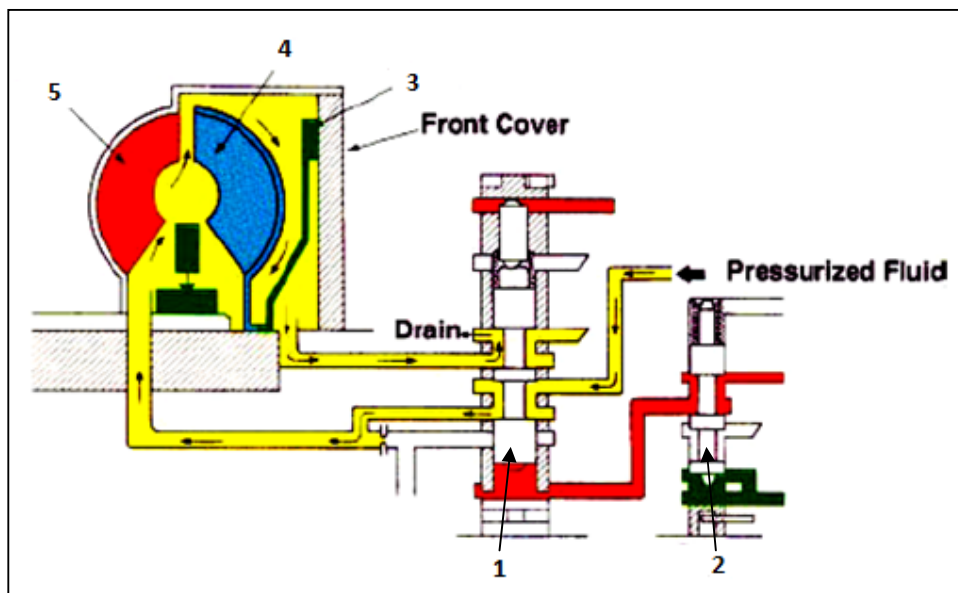


Figure 2: torque converter clutch operation

b) i) Write down the purposes of “converter stall test”

(4 marks)

ii) Determine the possible causes that may happen inside the automatic transmission if the “converter stall test” results are as below,

- Reading in “D” position is above specification
- Reading in “R” position is above specification
- Reading in both “D” and “R” position is below specification

(6 marks)

END OF QUESTION

Appendix

Gear ratio formula

$$\text{Speed Ratio} = \frac{\text{OUTPUT}}{\text{INPUT}}$$

$$1^{\text{st}} \text{ Speed} = \frac{\text{ANNULUS}}{\text{FORWARD SUN GEAR}}$$

$$2^{\text{nd}} \text{ Speed} = \left[\frac{\text{ANNULUS} \left(\frac{\text{Reverse Sun Gear}}{\text{FORWARD SUN GEAR}} \right) + \text{ANNULUS}}{\text{ANNULUS GEAR} + \text{REVERSE SUN GEAR}} \right]$$

$$3^{\text{rd}} \text{ Speed} = 1 : 1 \text{ (Direct Flow)}$$

$$4^{\text{th}} \text{ Speed} = \frac{\text{ANNULUS}}{\text{ANNULUS} + \text{REVERSE SUN GEAR}}$$

$$\text{Reverse} = \frac{\text{ANNULUS}}{\text{REVERSE SUN GEAR}}$$