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CONFIDENTIAL

SET A

UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2014 SESSION

SUBJECT CODE	:	**FVD 30202 / 24302**
SUBJECT TITLE	:	**TRANSMISSION 2**
LEVEL	:	**DIPLOMA**
TIME / DURATION	:	**2.5 HOURS** **3.30 pm - 6.00 pm**
DATE	:	29 MAY 2014

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**

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) Write down the benefits of using "torque converter clutch" inside the torque converter in automatic transmission instead of using normal torque converter.

(2 marks)

b) Explain the denotation of "P" stated at the automatic gear selector mechanism of automatic transmission vehicle.

(5 marks)

c) List down the problems that may occur in automatic transmission operation if the "anti-foam" was not added into the Automatic Transmission Fluid (ATF).

(3 marks)

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

(5 marks)

e) Explain the "Stall phase" that occurs in torque converter operation during transferring engine power to the drive wheel.

(5 marks)

Question 2

a) Name **TWO (2)** types of automatic clutch that are used to transmit power from engine to the transmission.

(2 marks)

b) Write down the basic components of Ravigneaux type planetary gear set that are used to provide various gear ratios in automatic transmission.

(3 marks)

c) List down the differences between KF4A gear box and KF3A gear box.

(5 marks)

d) Describe the main functions of 2-3 and 3-4 shift valve that are fitted in automatic transmission hydraulic system (KF4A).

(5 marks)

e) Explain the functions and basic operation of pressure control solenoid valve (PCSV) that is installed in automatic transmission.

(5 marks)

Question 3

a) Explain the operation of simple planetary gear components when the shift speed is in 3rd gear (direct drive).

(5 marks)

b) Write down the correct procedures of performing the "torque converter stall test".

(8 marks)

c) In typical Ravigneaux type gear set which is consists of;

- long pinion (18 gear teeth)
- short pinion (20 gear teeth)
- forward sun gear (28 gear teeth)
- reverse sun gear (36 teeth)
- ring/annulus gear (78 gear teeth)
- planet carrier

Forward sun gear mesh with short pinion and reverse sun gear mesh with long pinion. Then the long pinion meshes with the short pinion and the annulus gear.

With **aids of sketch determine the gear ratio and the direction of rotation** of output member when forward sun gear act as driving member, annulus gear as output member and planet carrier is stationary

(7 marks)

SECTION B (Total: 40 marks)

INSTRUCTION: Answer TWO questions only.

Question 1

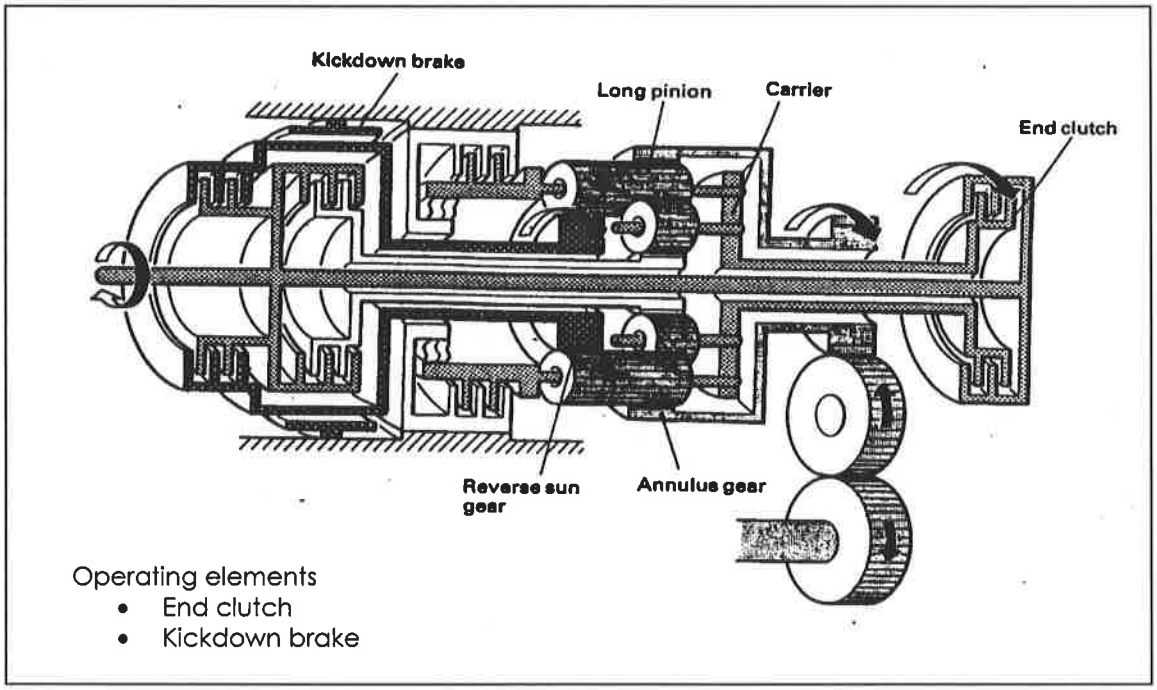

Figure 1: Operating Element in Typical Automatic Transmission

a) By referring to figure 1, answer the questions below

i) By referring to 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 transmission 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 4.002:1 and using the tire that has outer diameter of 68.5cm

(10 marks)

Question 2

a) Clearly describe the mechanical components below:

i. Fluid coupling.

(5 marks)

ii. Torque converter.

(5 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) Name 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) Determine the function of fix orifice in automatic transmission hydraulic system.

(4 marks)

ii) Explain the operation of hydraulic circuit at right and determine the differences between these two circuits.

(6 marks)

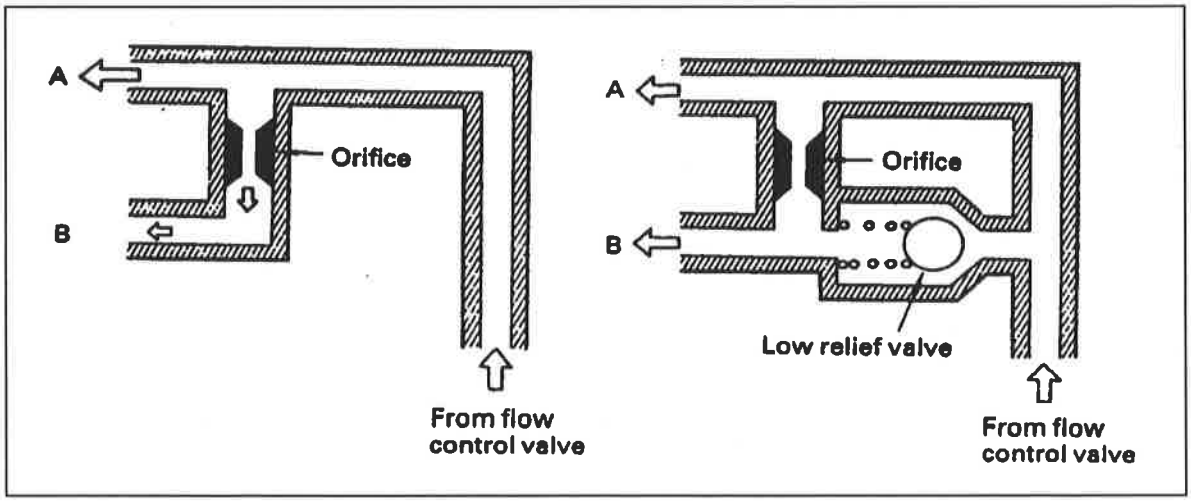

Figure 2: check valve operation

b) i) Write down the purposes of "converter stall test".

(4 marks)

ii) Determine the problem / symptom that may occurs in automatic transmission operation if the sensors below is failure,

- Engine coolant temperature sensor.

(2 marks)

- Overdrive control switch (OD button).

(2 marks)

- Inhibitor switch.

(2 marks)

END OF QUESTION

Appendix

Gear ratio formula

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

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

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

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

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

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