



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
SEPTEMBER 2014 SESSION**

SUBJECT CODE : FVD23003
SUBJECT TITLE : TRANSMISSION 1
LEVEL : DIPLOMA
TIME / DURATION : 9.00 AM – 12.00 PM
(3 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 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.
 6. Answer all questions in English
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THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)**INSTRUCTION: Answer ALL questions.****Question 1**

- a) List down **FOUR (4)** main components of rear wheel drive system. (2 marks)
- b) List the functions of torsional coil spring that is installed in clutch disc. (3 marks)
- c) List down **THREE (3)** basic components of clutch system and explain the basic operation of the clutch system. (5 marks)
- d) List **FIVE (5)** main functions of the automotive clutch system. (5 marks)
- e) Determine the output that will be obtained when a set of gears is working together inside the vehicle gear box. (5 marks)

Question 2

- a) Describe the helical gear type that is widely used in automotive gear box. (5 marks)
- b) List down the types of gear box that are used in automotive industries. (5 marks)

- c) Define the main function of constant velocity joint (CV joint) and name the **TWO (2)** types of constant velocity joints that are commonly used in front wheel drive vehicle.

(5 marks)

- d) Describe the "Differential unit" that used in automotive drive train system and explain the applications of differential in automotive vehicles.

(5 marks)

Question 3

- a) Explain the general procedures for checking clutch slippage that occurs in vehicles equipped with manual clutch system.

(5 marks)

- b) Customer complained that his car was producing clicking noise when he made sharp curve (both side left or right curve). Explain the related procedures of inspecting the above problems.

(5 marks)

- c) A typical gear operation consists of 35 teeth of driving gear which is rotating at 350 rpm, while the driven gear has 65 teeth and 15 teeth of idler gear.

- i. Calculate the respective gear ratio.

(2 marks)

- ii. Identify the function of idler gear.

(2 marks)

- iii. Calculate the output speed and output torque if the input torque is 235 Nm.

(6 marks)

SECTION B (Total: 40 marks)**INSTRUCTION: Answer TWO (2) questions only.****Question 1**

a) A customer complained that his vehicle has a problem of hard transmission shifting and also produced a sound of gear clash especially when shifting into reverse. Determine

i) The problem of the vehicle. (2 marks)

ii) The probable causes of the above symptoms. (3 marks)

iii) The general procedures for checking the above problem and the necessary actions that should be taken in order to solve the problem. (5 marks)

b) After performing the servicing activities on manual transmission / transaxle, it is required to refill the transmission/transaxle with the new lubricant.

i) List the types (grade) of lubricants that are suitable for manual gear box. (2 marks)

ii) State the correct procedures of changing the manual gear box lubricant. (8 marks)

Question 2

- a) A customer complained that his car produced whirring, grating or grinding noises when the clutch was fully engaged (pedal is fully released) and the sound disappeared when the clutch was in the process of disengagement (pedal is pushed). Determine
- i) The possible causes of this problem. (2 marks)
 - ii) The necessary actions that should be taken in order to solve the problem. (3 marks)
- b) A vehicle is running with engine speed of 3000 RPM in 5th gear. If the 5th gear ratio is 0.57:1, final drive ratio is 4.07:1 and the vehicle uses tire size 175/70R13 where the tire outside diameter is 68cm, calculate
- i) The output (wheel) speed of the vehicle. (3 marks)
 - ii) The maximum speed (k/mh). (7 marks)
- c) A customer complained that he felt rapid up-and-down movement of the clutch pedal as the clutch was engaging or disengaging.
- i) Define the possible causes of this problem. (2 marks)
 - ii) Explain the general procedure of checking this problem. (3 marks)

Question 3

- a) A typical automotive gear box consists of various number of gear teeth as stated in table 1 below.

Table 1. Number of gear teeth for typical automotive gear train

Clutch gear	= 23 teeth
Counter clutch gear	= 33 teeth
1 st counter gear	= 14 teeth
2 nd counter gear	= 22 teeth
3rd counter gear	= 35 teeth
4 th counter gear	= 38 teeth
Reverse counter gear	= 14 teeth
Idler gear	= 15 teeth
Speed gear 1 st	= 37 teeth
Speed gear 2 nd	= 35 teeth
Speed gear 3 rd	= 21 teeth
Speed gear 4 th	= 18 teeth
Speed gear reverse	= 34 teeth
Pinion gear	= 13 teeth
Ring gear	= 65 teeth

- i) By referring to table 1, construct the respective gear train arrangement for the above automotive gear train.
(2 marks)
- ii) Calculate the respective gear ratio of the above gear train and the overall ratio of each gear.
(8 marks)
- b) After completing the task of changing clutch mechanism set and replacing the clutch hydraulic linkage repair kit, the mechanics refilled the clutch master cylinder with new hydraulic fluid and test the system. Found that the clutch linkage system felt soft/spongy when clutch pedal was pressed and also produced gear clash when being attempted to shift the gear.
- i) Determine the possible causes of the problem and the ways to solve it.
(4 marks)
- ii) Describe the complete procedures to solve the problem.
(6 marks)

END OF QUESTION