



**UNIVERSITI KUALA LUMPUR  
Malaysia France Institute**

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**FINAL EXAMINATION  
JANUARY 2014 SESSION**

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**SUBJECT CODE : FVD23003**  
**SUBJECT TITLE : TRANSMISSION 1**  
**LEVEL : DIPLOMA**  
**TIME / DURATION : 3 HOURS**  
**DATE :**

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**INSTRUCTIONS TO CANDIDATES**

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- 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**
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**THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.**

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

- a) Define the benefit of using four wheel drive system (4WD).  
(2 marks)
- b) Write down the functions of cushion spring that is installed in clutch disc.  
(3 marks)
- c) List down types of pressure plate assembly that are used in automotive industries and write down the advantages of each type.  
(5 marks)
- d) With the aids of a sketch explain the basic operation of hydraulic clutch linkages that is used in automotive industries.  
(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) Name the **TWO (2)** types of drive shaft that are commonly used in front wheel drive vehicle and explain the differences of the both drive shaft.

(5 marks)

- d) Clearly explain the types of rear axle that are used in automotive industries.

(5 marks)

### Question 3

- a) Clearly explain the general procedures for checking clutch pedal pulsation.

(5 marks)

- b) Write down the related procedures of inspecting the problems that may occur in front wheel drive driveline system and explain each of them.

(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. Define 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.****Please use the answer booklet provided.****Question 1**

- a) A customer complained that his vehicle has a problem of hard transmission shifting and also produce 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 is fully engage (pedal is fully release) and the sound disappeared when the clutch is 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 running with engine speed of 3000 RPM in 5<sup>th</sup> gear, if the 5<sup>th</sup> 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 feel rapid up-and-down movement of the clutch pedal as the clutch disengages or engages.
- i) Define the possible causes of this problem. (2 marks)
  - ii) Write down 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 <sup>st</sup> counter gear	= 14 teeth
2 <sup>nd</sup> counter gear	= 22 teeth
3rd counter gear	= 35 teeth
4 <sup>th</sup> counter gear	= 38 teeth
Reverse counter gear	= 14 teeth
Idler gear	= 15 teeth
Speed gear 1 <sup>st</sup>	= 37 teeth
Speed gear 2 <sup>nd</sup>	= 35 teeth
Speed gear 3 <sup>rd</sup>	= 21 teeth
Speed gear 4 <sup>th</sup>	= 18 teeth
Speed gear reverse	= 34 teeth
Pinion gear	= 13 teeth
Ring gear	= 65 teeth

- i) By referring to table 1, draw 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 refill the clutch master cylinder with new hydraulic fluid and test the system. Found that the clutch linkage system feels soft/spongy when clutch pedal is pressed and also produces 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) Write down the complete procedures to solve the problem.
- (6 marks)

**END OF QUESTION**