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CONFIDENTIAL

SET A

UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION

SEPTEMBER 2013 SESSION

SUBJECT CODE	**:**	**FVB 20303**
SUBJECT TITLE	**:**	**ADVANCE TRANSMISSION TECHNOLOGY**
LEVEL	**:**	**BACHELOR**
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 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. **Answer FOUR questions ONLY.**
6. **Answer all questions in English.**

THERE ARE 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer Only FOUR questions.
(Total: 100 marks)

Please use the answer booklet provided.

Question 1 (25 marks)

(a) Explain the purpose of automatic transmission.

(5 marks)

(b) The **Figure 1** shows the schematic of basic power flow for the automatic transmission. Describe the power flow from the engine to output shaft of the automatic transmission.

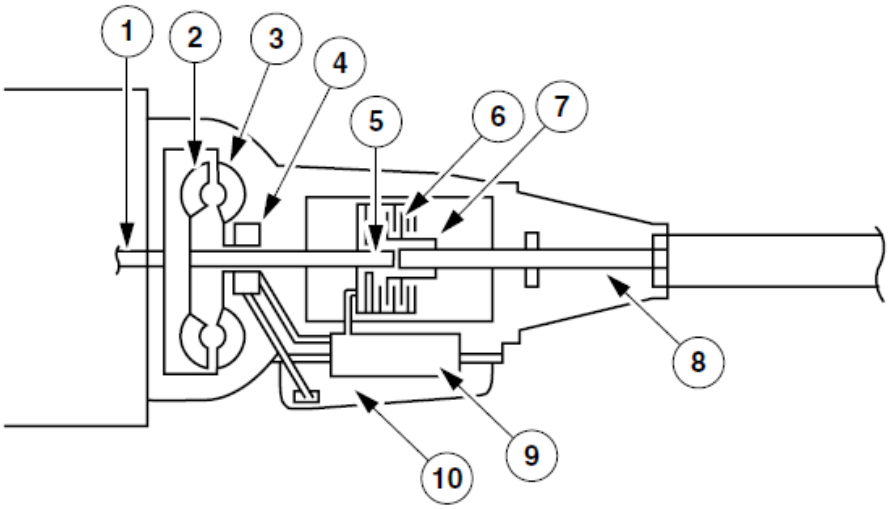


Figure 1

(10 marks)

(c) The safety mechanisms are usually equipped with an automatic transmission vehicle for driving. Explains how the system works.

(5 marks)

(d) The **Figure 2** shows the torque converter. Explain how its components operate.

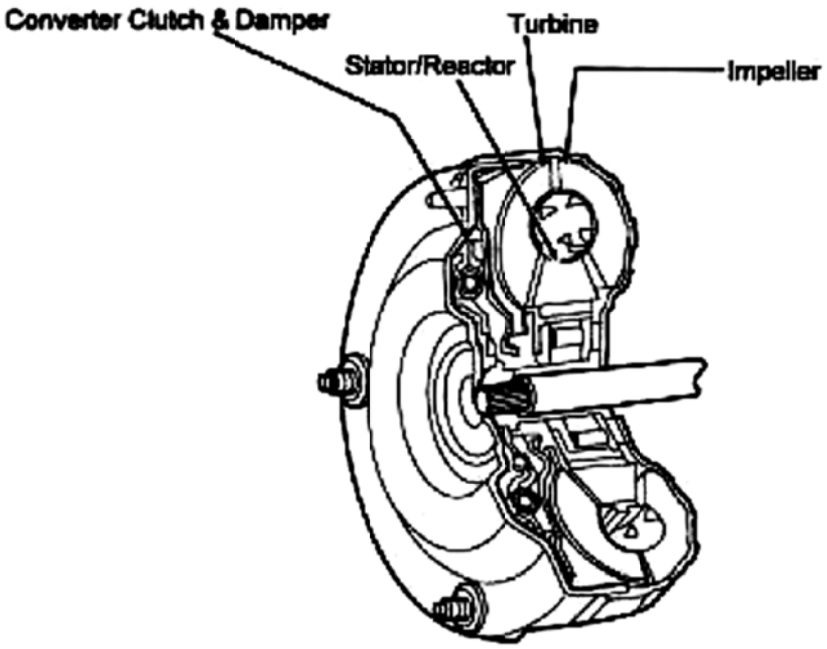


Figure 2

(5 marks)

Question 2 (25 marks)

(a) Explain why the planetary gear sets are used in most automatic transmissions.

(5 marks)

(b) Explain why the automatic transmissions use clutches and bands.

(5 marks)

(c) Some clutch plates have grooves cut in them. Give the reason.

(5 marks)

(d) An overdrive simple epicyclic gear train has sun and annulus gears with 21 and 75 teeth respectively (**Figure 2**). If the input speed from the engine drives the planet carrier at 3000 rpm, determine:

i. the overdrive gear ratio

(3 marks)

ii. the number of planet gear teeth

(3 marks)

iii. the annulus ring and output shaft speed

(2 marks)

iv. the percentage of overdrive

(2 marks)

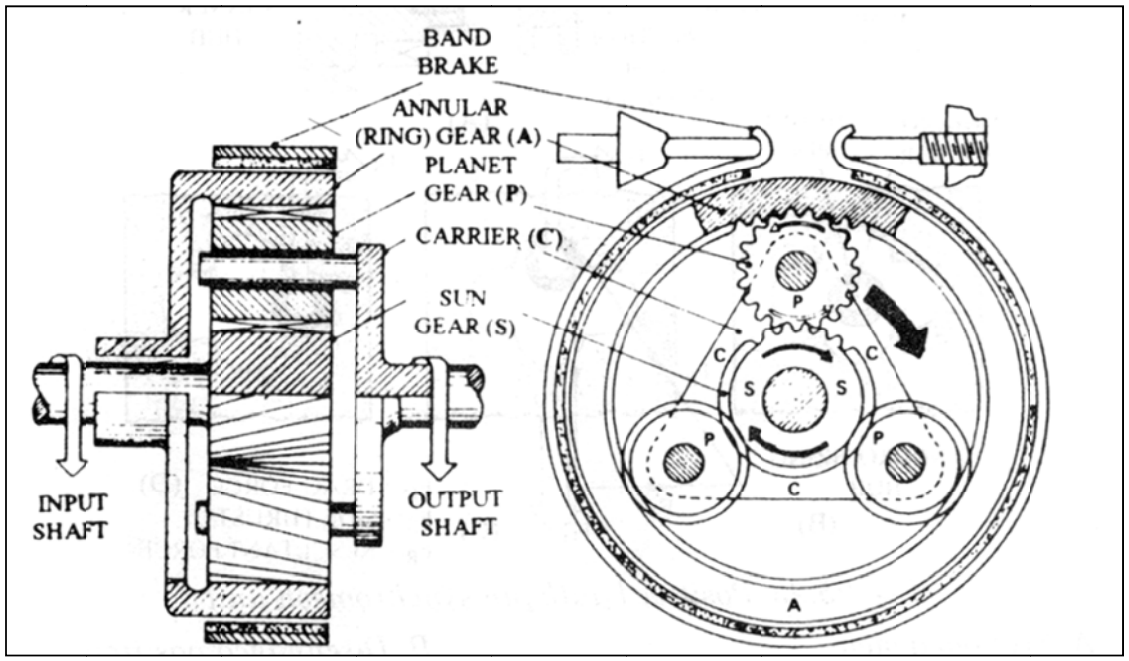


Figure 2: Simple epicyclic gear train.

Question 3 (25 marks)

(a) Explain the advantages of electronic control transmission system.

(5 marks)

(b) Based on **Figure 3**; explain the operation of transmission control system.

(5 marks)

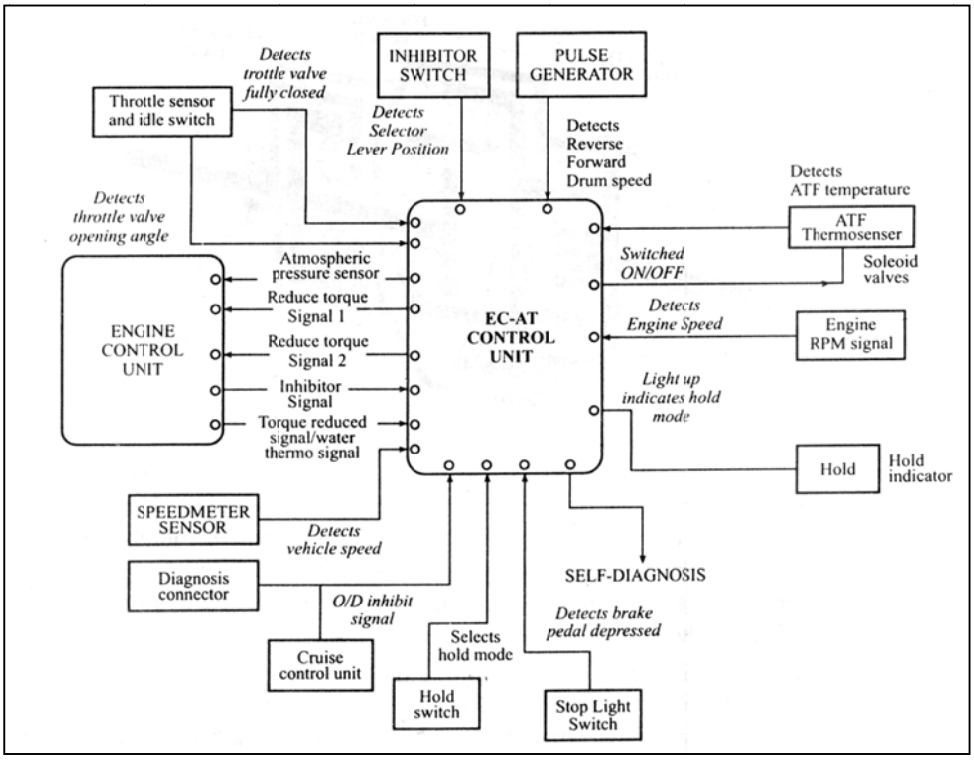


Figure 3: Transmission Control System Structure

(c) Describe the advantages of lowering the engine torque during gear shifting.

(5 marks)

(d) Based on the following situation, diagnose the causes of electronic control transmission problem:

Case 1: One car use electronic controlled transmission but it would not work automatically shift into third. Sometimes there is a check engine light or no check engine light.

(5 marks)

Case 2: One car would not start in park (P). The starter will not engage, no sound, except a main relay click but all other electrical such as headlights are working.

(5 marks)

Question 4 (25 marks)

(a) **Figure 4** shows a Simple Servo. Explain its mechanism.

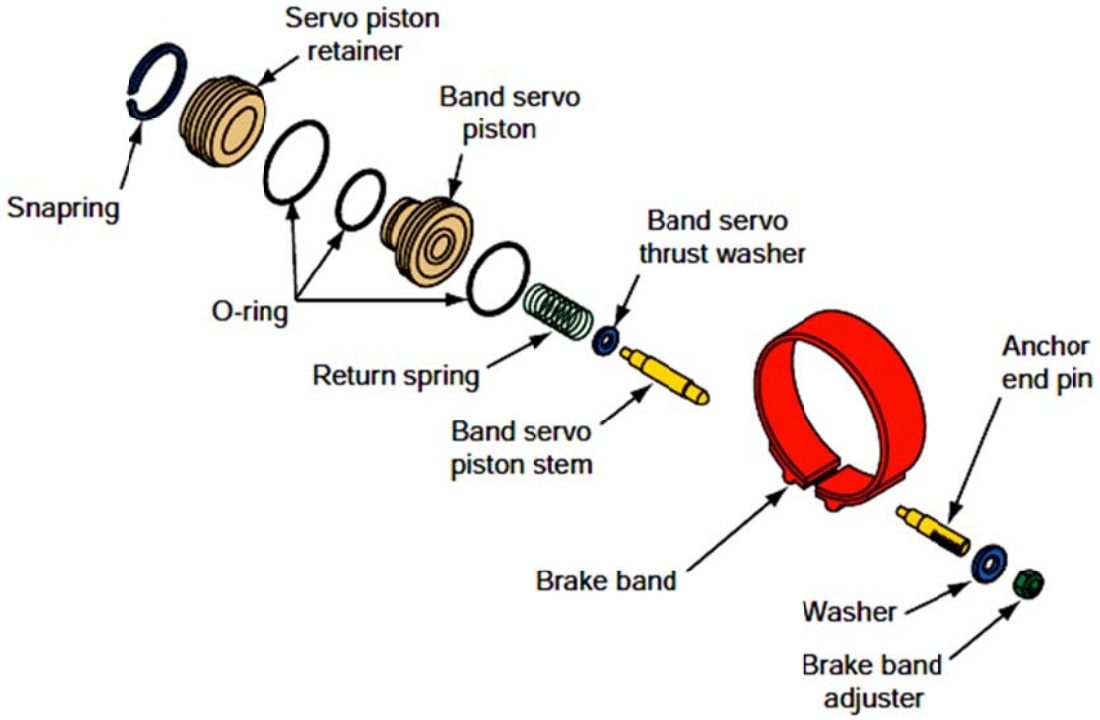


Figure 4

(4 marks)

(b) **Figure 5** shows the valve body assembly. Explain the valve body and its purposes.

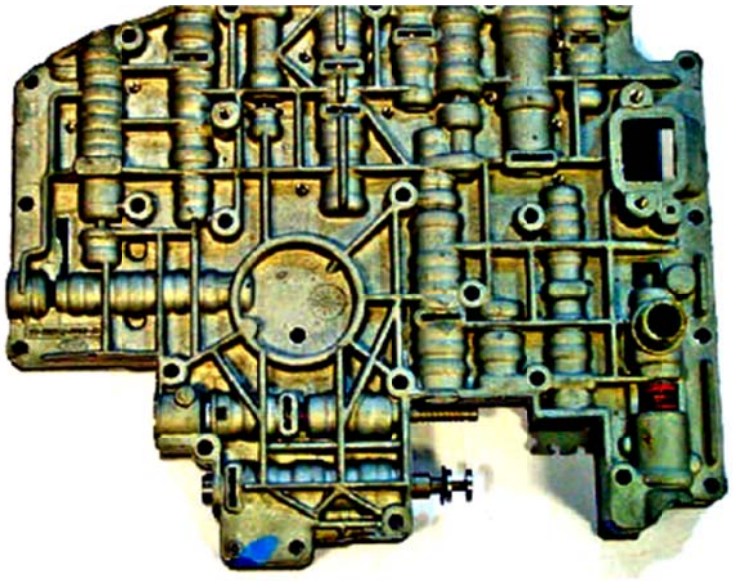


Figure 5. A typical valve body.

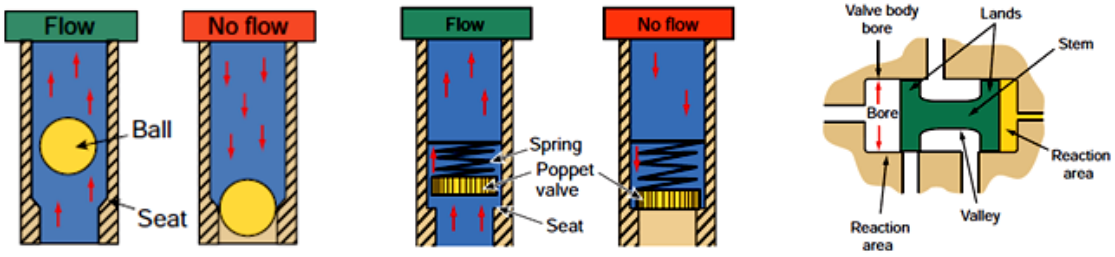
(5 marks)

(c) **Figure 6** shows the valves. Explain:

(i) Check Ball Valve **(2 marks)**

(ii) Poppet Valve **(2 marks)**

(iii) Spool Valve **(2 marks)**



(a) Check Valve (b) Poppet Valve (c) Spool Valve

(d) A customer complaint that he has repaired the car due to the fluid leaking from the underside. He told that the mechanic has reprogrammed the gear box with the automatic transmission settings. However, the car will regularly place itself into 'safe mode'. It will not change from 3rd gear, and a message on the display screen shows “Automatic Transmission Fault". Identify and solve this problem.

(10 marks)

Question 5 (25 marks)

(a) Explain the purpose and function of continuously variable transmission (CVT).

(5 marks)

(b) Explain the operation of continuous variable transmission, during forward and reverse movement.

(5 marks)

(c) The pulleys used in this CVT design can vary their width by varying the hydraulic pressure applied to them. Explain the effect of:

(i) Higher application pressure. **(5 marks)**

(ii) Lower application pressure. **(5 marks)**

(iii) Increasing vehicle speed. **(5 marks)**

Question 6 (25 marks)

Based on the following situation, diagnose the probable causes of continuous variable transmission (CVT) problem:

Case 1: Engine runs, but vehicle does not move in any position. **(10 marks)**

Case 2: Vehicle does not move in D, S, and L positions. **(10 marks)**

Case 3: A/T gear position indicator does not indicate shift lever positions **(5 marks)**

END OF QUESTION