

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020**

COURSE NAME : AUTOMOTIVE DRIVETRAIN
COURSE CODE : BNG 30603
PROGRAMME CODE : BNG
EXAMINATION DATE : DECEMBER 2019 / JANUARY 2020
DURATION : 2 HOURS 30 MINUTES
INSTRUCTION : ANSWER ALL QUESTIONS

TERBUKA

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

- Q1**
- (a) Torque converter is a type of fluid coupling, which allows the engine to spin somewhat independently of the transmission. Identify **FOUR (4)** components inside torque converter. (4 marks)
- (b) The torque converter transfer power from the engine to the transmission. Without a torque converter, automatic transmission won't work. Explain the working principle of torque converter. (6 marks)
- (c) Justify the important of planetary gear sets in automatic transmission. (4 marks)
- (d) Stall test consist of determining maximum engine speed obtained at full throttle in "D" and "R" positions. This test is to checks the condition of torque converter clutch.
- (i) Sazali want to perform stall test to investigate the condition automatic transmission vehicle. Develop stall test procedure for checking torque converter condition and include precaution step in this procedure. (4 marks)
- (ii) A technician is performing a stall test on a vehicle with an automatic transmission. In Drive mode, the tachometer indicates the engine's RPM's are above specifications. Predict the outcome of this test result. (2 marks)
- Q2**
- (a) Continuous Variable Transmission (CVT) is a system with seamless, "stepless" gear transmission. CVT transmission provide a responsive reaction to incline driving and also provide a smoother ride over long distances. Describe the function of V-belt when gear changes in CVT transmission. (2 marks)
- (b) Discover advantages and disadvantages of CVT Transmission. (6 marks)
- (c) The 'TKO 500' manual transmission has been installed into 1985 Ford Mustang GT. The gear ratio for the manual transmission shown in **Table Q2(c)**. The wheels also been upgraded with YOKOHAMA A-Drive R1 Tires with nominal radius of 17 in. If the driving gear has 10 teeth. Predict the top speed for each gear if the maximum engine is 8500 RPM. (Answer in km) (12 marks)

TERBUKA

- Q3**
- (a) Explain the purpose of driveshaft in drivetrain system. (2 marks)
 - (b) Predict **THREE (3)** vehicle condition symptoms when U-joint worn out. (6 marks)
 - (c) A vehicle has a vibration since new U-joint were installed. The joints are the correct part numbers and have been installed into the driveshaft correctly. Predict the possible cause of this problem. (2 marks)
 - (d) The illustration in **Figure Q3(d)** is a problem with a Hookes-types joint; the line B is bisecting the angle between the two shafts. Draw this drawing again in your answer book with a centre line through the joint driving contacts. (2 marks)
 - (e) Rosli spot the dark grease along the edge of their vehicle wheel and he suspect the CV joint is in bad condition. Suggest the additional method to confirm the CV joint is worn out. (4 marks)
 - (f) State the condition of double U-joint if driveshaft achieve constant velocity over large total operating angle. (4 marks)
- Q4**
- (a) The differential is located between the axles and permits one axle to turn at a different speed from that of the other. Explain the function of differential in vehicle. (4 marks)
 - (b) Illustrate the simple schematic of a differential. (6 marks)
 - (c) Jimmy have been noticed the noise at the back area of their vehicle. Unfortunately, the noises is too difficult to identify either the wheel noise or the differential noise. Design the method to identify the noise. (6 marks)
 - (d) Other than whining noise, predict the possibility cause that show the differential is worn out. (4 marks)

TERBUKA

- Q5**
- (a) Describe the component used to transfer engine torque to all four wheel drive. (2 marks)
 - (b) Explain the configuration of full-time four-wheel drive. (4 marks)
 - (c) Develop the procedure for transfer case / unit removal and replacement. (8 marks)
 - (d) Illustrate the schematic diagram:
 - (i) The four-wheel drive vehicle by using existing rear-wheel drive and adding a transfer case.
 - (ii) The front-wheel drive with adding of rear axle output shaft and center differential assembly. (4 marks)
 - (e) Predict the symptom if the transfer case output seal leak. (2 marks)

TERBUKA

-END OF QUESTIONS -

FINAL EXAMINATION

SEMESTER / SESSION : SEM I / 2019/2020
COURSE NAME : AUTOMOTIVE DRIVETRAIN

PROGRAMME CODE : BNG
COURSE CODE : BNG 30603

Table Q2(c)

Gear	Gear Ratio
1 st Gear	3.3
2 nd Gear	1.8
3 rd Gear	1.4
4 th Gear	1.0
5 th Gear	0.8

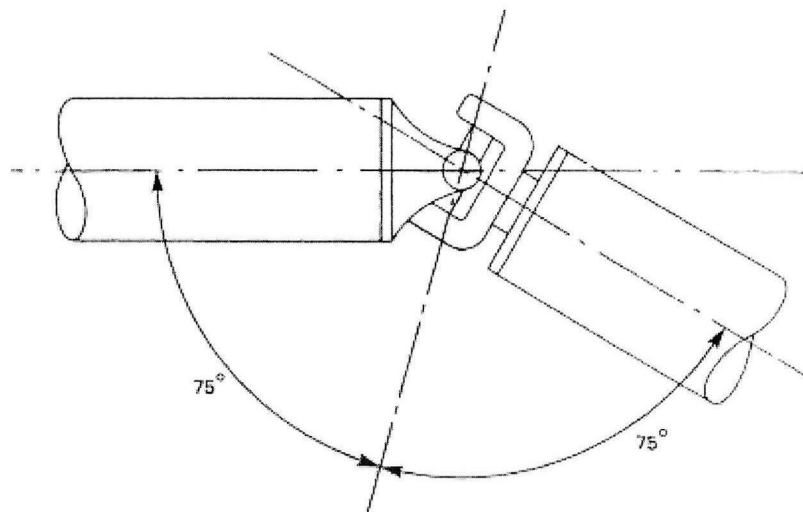


Figure Q3(d)

TERBUKA