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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016**

COURSE NAME : AUTOMOTIVE DRIVETRAIN
COURSE CODE : BNG 30603
PROGRAMME CODE : BNG
EXAMINATION DATE : JUNE / JULY 2016
DURATION : 3 HOURS
INSTRUCTION : ANSWERS ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** (a) Almost every type of gear can be found in an automobile.
- (i) List the most common type of gear use in automobiles.
(5 marks)
- (ii) Describe **ONE (1)** advantages and disadvantages of each gear listed above.
(10 marks)
- (b) (i) Define the gear law.
(2 marks)
- (ii) The gear law can be extended into **TWO (2)** multiple gear systems. Discuss it. Use an appropriate equation and figure to analyze the gear systems.
(8 marks)
- Q2** The 'TKO 500' manual transmission has been installed into 1985 Ford Mustang GT. The gear ratios for the manual transmission shown in **Table Q2**. The wheels also been upgraded with YOKOHAMA A-Drive R1 Tires (205/40R17). If the driving gear has 10 teeth,
- (a) calculate the number of teeth for each gear.
(5 marks)
- (b) predict the top speed for each gear if the maximum engine speed is 8000 rpm.
(20 marks)
- Q3** Ramli has been running the chassis dynamometer for his testing car at UTHM Automotive Laboratory. The testing car has the front wheel drive with front tires have a nominal radius of 15 inch. The torque curve and gear ratios shown in the **Table Q3**. Generate a plot of force at the road versus vehicle speed for the first gear.
(30 marks)

- Q4** (a) There are two significant types of continuously variable transmission (CVT), the Van Doorne belt system, and the Torotrak system. Differentiate both systems with give **FIVE (5)** comparison for both.
- (5 marks)
- (b) Upon existing the transmission, the next link in the driveline is the driveshaft itself. The driveshaft must transmit the torque through an angle. This accomplished through the use of Hooke's joint or constant velocity joints. However, the driveshaft subject to speed variation. Propose **ONE (1)** method to eliminate the speed variation and explain your proposal.
- (5 marks)
- (c) Open differential commonly associate with wheel loses traction. Discuss the popular option to overcome the phenomenon.
- (4 marks)
- (d) Four wheel drive can be categorized into **THREE (3)** categories. Describe it.
- (6 marks)

-END OF QUESTIONS -

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Table Q2

Gear	Gear Ratio
1 st	3.30
2 nd	1.80
3 rd	1.40
4 th	1.00
5 th	0.80

Table Q3

RPM	Torque (ft-lb)	Gear	Gear Ratio
1000	380	First	2.65
2000	430	Second	1.70
3000	440	Third	1.30
4000	480	Fourth	1.00
5000	400	Fifth	0.75
6000	320	Sixth	0.50