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**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2018/2019**

COURSE NAME : INTRODUCTION TO AUTOMOTIVE TECHNOLOGY

COURSE CODE : BNG 20103

PROGRAMME CODE : BNG

EXAMINATION DATE : JUNE / JULY 2019

DURATION : 2 HOURS AND 30 MINUTES

INSTRUCTION : ANSWERS ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

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- Q1** (a) (i) The turbocharger could be the trouble-free device, if properly maintained. Explain **FOUR (4)** methods to maintain the turbocharger. (8 marks)
- (ii) Explain **TWO (2)** recommended routine service procedures to prevent turbocharger failures. (2 marks)
- (b) (i) Define the power adder in engine system. (2 marks)
- (ii) Differentiate the wet and dry system for nitrous oxide system in gasoline engine. (4 marks)
- (iii) Adding nitrous oxide in the engine can be used to increase the engine horsepower. Propose **ONE (1)** method to increase the nitrous oxide flow into the engine and explain it. (4 marks)
- Q2** (a) Illustrate the schematic diagram for the typical automotive air-conditioning system that uses a cycling clutch and an orifice tube. Label each components and specify the diagram with high and low temperature and pressure. (8 marks)
- (b) All automotive air-conditioning system are close system. A refrigerant is circulated through the system by a compressor that is powered by the engine through an accessory drive belt. Analyse the air-conditioning refrigeration cycle. (10 marks)
- (c) Predict the consequences if use the wrong refrigerant oil in an air-conditioning system. (2 marks)
- Q3** (a) Explain **FOUR (4)** basic requirements for brake design. (8 marks)
- (b) Determine the relationship between kinetic energy and brake design. You may use the mathematical term to explain your answer. (6 marks)
- (c) Determine how the mechanical advantage used in the braking system. Explain in detail with appropriate diagram. (6 marks)

- Q4** (a) (i) Describe **FOUR (4)** purposes of suspension system. (4 marks)
- (ii) It is become a trend to lower the vehicle by cutting the coil springs. However, it is not recommended. Analyse **THREE (3)** possible negative consequences. (6 marks)
- (b) (i) All type of suspensions use springs that share a common characteristic described by Hooke's Law. Explain the Hooke's Law. Give proper example and appropriate diagram to describe your answer. (6 marks)
- (ii) Describe **THREE (3)** strength and handling characteristics of a coil spring. Show your answer with appropriate diagram. (4 marks)
- Q5** (a) Explain **THREE (3)** type of gears for manual transmission. (6 marks)
- (b) Gear ratio can be expressed into **THREE (3)** categories. Describe it. (6 marks)
- (c) Explain **FOUR (4)** worn or defective can cause a manual transmission/transaxle to be difficult to shift. (8 marks)

**-END OF QUESTIONS -**