Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
(TAKE HOME)
SEMESTER I
SESSION 2020/2021

COURSE NAME	:	VEHICLE SUB-SYSTEM TECHNOLOGY
COURSE CODE	:	BNG 31003
PROGRAMME CODE	:	BNG
EXAMINATION DATE	:	JANUARY/FEBRUARY 2021
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1 (a) Define what is an internal combustion engine.

(2 marks)

(b) Identify one of the future technologies in the internal combustion engine and explain its benefits compared to the current design.

(6 marks)

(c) With the aid of a diagram, illustrate the 5-speed manual transmission construction layout and label the main components.

(6 marks)

(d) Analyze the differences between Automatic Transmission (AT), Continuous Transmission (CVT) in terms of acceleration performance and vehicle fuel economy.

(6 marks)

Q2 (a) Define vehicle chassis in automotive technology.

(2 marks)

(b) Chassis structures are stressed by internal and external loads. Explain each load in technical manners.

(4 marks)

(c) Analyze the differences between Ladder Frame and Unibody chassis structure

(6 marks)

(d) Sketch **TWO (2)** typical frame section design and state its advantages in loading resistance.

(4 marks)

(e) Identify **FOUR (4)** requirements of ideal chassis design.

(4 marks)

Q3 (a) Distinguish between Hydraulic Power Steering and Electric Power Steering (EPS) system used in the modern vehicle and how it will affect the overall vehicle performance and fuel economy.

(6 marks)

(b) Define the steering system in automotive technology.

(2 marks)

(c) Differentiate between unsprung weight transfer and sprung weight transfer

(4 marks)

(d) Suspension systems can be broadly classified into two subgroups: dependent and independent. Explain the differences and give an example of an application for each group.

(4 marks)

(e) Ackermann steering geometry is designed to solve wheels on the inside and outside of a turn needing to trace out a circle of different radii. Sketch the geometry and illustrate it while turning.

(4 marks)

Q4 (a) Define radial and cross-ply tires.

(4 marks)

(b) Electronic stability control (ESC) and the Antilock-braking system (ABS) are the standard safety features in modern vehicles nowadays. Differentiate each of the systems with a sketch and technical explanation.

(6 marks)

(c) Explain the basic operations of Electric Brake Distribution (EBD).

(4 marks)

(d) A drum brake is a brake that uses friction caused by a set of shoes or pads that press outward against a rotating cylinder shaped part called a brake drum. With the aid of a diagram, sketch the brake drum system and label each component

(6 marks)

- **END OF QUESTION -**