Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020

COURSE NAME	:	VEHICLE SUB-SYSTEM TECHNOLOGY
COURSE CODE	:	BNG 31003
PROGRAMME CODE	:	BNG
EXAMINATION DATE	:	DECEMBER 2019 / JANUARY 2020
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1 (a) Explain what is an internal combustion engine?

(2 marks)

(b) The most common design engines are two-stroke and four-stroke. Differentiate the two designs.

(6 marks)

(c) Explain with the neat sketch the layout/diagram of turbocharged engine.

(6 marks)

(d) List **TWO (2)** advantages of turbocharger compared to supercharger.

(2 marks)

(e) Compare spark ignition (SI) with compressed ignition (CI) system used in internal combustion engine.

(4 marks)

Q2 (a) List **TWO (2)** basic functions of automobile transmission.

(2 marks)

(b) With the aid of a diagram, explain briefly the working principle of manual friction clutch system during engaging and disengaging process.

(5 marks)

(c) List **TWO (2)** functions of final drive and **TWO (2)** types of differential.

(4 marks)

(d) Analyze the differences between Automatic Transmission (AT), Continuous Transmission (CVT) and Dual Clutch Transmission (DCT).

(9 marks)

Q3 (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 Conventional Frame and Integral Frame.

(6 marks)

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

(4 marks)

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

(4 marks)

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Q4 (a) Distinguish between Hydraulic Power Steering and Electric Power Steering (EPS) system used in modern vehicle.

(6 marks)

(b) Define 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 example of application for each group.

(4 marks)

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

(4 marks)

Q5 (a) Define radial and cross ply tires. Explain the advantages of each construction.

(4 marks)

(b) Electronic stability control (ESC), and Antilock-braking system (ABS) are the common safety features in modern vehicle nowadays. Differentiate each of the system with technical explanation.

(6 marks)

(c) Define traction control system (TCS) and how does it work?

(4 marks)

(d) A disc brake is a type of brake that uses calipers to squeeze pairs of pads against a disc or rotor to create friction. With the aid of a diagram, sketch the brake disc system and label each component.

(6 marks)

- END OF QUESTION -

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