UNIVERSITI KUALA LUMPUR
KAMPUS CAWANGAN MALAYSIAN SPANISH INSTITUTE

FINAL EXAMINATION

OCTOBER 2025 SEMESTER

COURSE CODE	:	SFB36102 (V2)
COURSE TITLE	:	AUTOMOTIVE SAFETY
PROGRAMME NAME	:	BACHELOR OF ENGINEERING TECHNOLOGY (HONS) IN MANUFACTURING (AUTOMOTIVE)
DATE	:	23 JANUARY 2026
TIME	:	3:00PM - 5:00PM
DURATION	:	2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of ONE sections.
4. Section A consist of five questions. Answer FOUR (4) questions only.
5. Please write your answer on the answer booklet provided.
6. Please answer all questions in English only.
7. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

THERE ARE 7 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 100 marks)

Answer FOUR (4) questions.

Please use the answer booklet provided.

Question 1

German University professor has stated: "The motor vehicle has a duty to transport humans and goods from place A to place B, as a safely, as quickly and as comfortable as possible also as efficiently and environmentally friendly as possible".

(a) Define the automotive safety from the perspective of Malaysian Road and Act Regulation.

(2 marks)

(b) In this context, draw a diagram to show the four components of automotive safety.

(10 marks)

(c) The term 'safer cars' with relation to the new car assessment program (NCAP) is to distinguish one vehicle from another in terms of safety performances, namely on active safety aspects.

(8 marks)

(d) As Sales Executive for Automotive Company, provide five reasons of important to displayed NCAP labelling on all passenger cars .

(5 marks)

Question 2

Crash tests are conducted to assess the safety of automobiles and their components by subjecting them to destructive testing. These tests evaluate the car's crashworthiness and compatibility under different conditions, involving various angles, sides, and objects, such as other vehicles.

If the results of the frontal simulation crash test show the change in acceleration (a) started from 80g, 100g, 140g, 160g. If t_1 and t_2 consider the same for all levels of acceleration (a) which are at $5ms^{-1}$ and $12ms^{-1}$.

(a) Identify THREE (3) ranges of the Head Injury Criteria (HIC).

(6 marks)

(b) Analyze the results of Head Injury Criteria (HIC) for each accelertaion (a).

(10 marks)

(c) Discuss the obtained results from question (b).

(4 marks)

(d) State the occupant criteria for the frontal simulation crash test.

(5 marks)

Question 3

A traffic collision, also referred to as a motor vehicle collision, car accident, or car crash, occurs when a vehicle collides with another vehicle, pedestrian, animal, road debris, or stationary obstruction like a tree, pole, or building. Such collisions often result in injury, disability, death, property damage, and financial costs for both society and the individuals involved.

(a) Identify potential root causes based on the FIVE (5) categories of the traffic collision.

(10 marks)

(b) Discuss FIVE (5) potential root causes of the traffic collision based on the human factor.

(10 marks)

(c) State FIVE (5) main factors influencing the driver's field of view.

(5 marks)

Question 4

The markings on a tire consist of words, letters, and symbols on its sidewall. In addition to the brand name and model, these markings indicate the tire's size and characteristics, including width, sidewall height, diameter, tread pattern, load index, and speed rating, as shown in the figure below.

Refer Below - Figure1 : The tire marking .

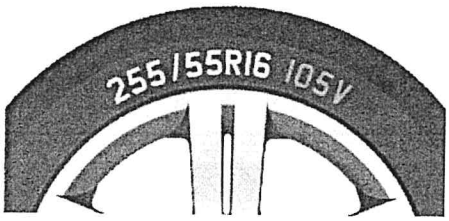

Figure 1: The tire marking

(a) Explain the meaning of the tyre specification "255/55R16" by breaking down each component, including tyre width, aspect ratio, tyre construction, and wheel diameter.

(8 marks)

(b) Tire is one of the components in the activation of the Antilock Brake System (ABS). Discuss and illustrate the process activation of the ABS.

(15 marks)

(c) Discuss TWO (2) regular maintenances of the tire in oder the objective of automotive safety.

(2 marks)

Question 5

Ergonomics involves designing the workplace to fit the needs of the worker rather than trying to make the worker adjust to the workplace. Good ergonomic design has been shown to increase work quality and production as well as worker well-being.

You are required analyze Figure 1 using ergonomic philosophy based on anthropometric analysis. The impact of analysis must be meeting ergonomic expectation which are comfort, safety, and quality.

Refer Below - Figure2 : The body posture of the driver .

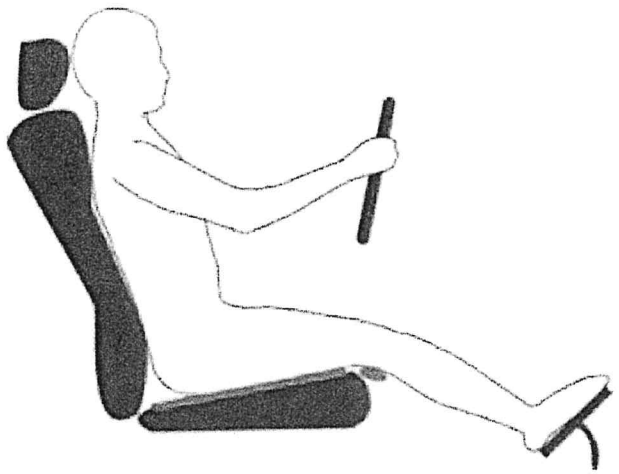

Figure 2: The body posture of the driver

(a) Identify FIVE (5) dimensions related to ergonomics based on the situation of Figure 1.

(5 marks)

(b) Evaluate the identified dimensions from question (a) by using an anthropometric analysis:

(10 marks)

(c) Injury tolerance limits, such as fractures, organ injuries, and other traumas have been classified as Abbreviated Injury Scale (AIS) and the Overall Abbreviated Injury Scale (OAIS).
Identify FOUR (4) purposed of Injury Tolerance Limits:

(8 marks)

(d) Explain the injury mechanisms for external injuries to the human body, and mechanisms for internal injuries?

(2 marks)

END OF EXAMINATION PAPER