UNIVERSITE CHEIKH ANTA DIOP DE DAKAR
❐❐◆❐❐
OFFICE DU BACCALAUREAT
Email : office@ucad.edu.sn
Site web : officedubac.sn

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Épreuve du 1er groupe

A N G L A I S

AI and Autonomous Vehicles

Artificial Intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. It involves the development of systems endowed with human intellectual characteristics such as the ability to reason. In our 21st-century world, digital technologies such as Artificial Intelligence and Machine Learning have taken center stage and are blazing the trail by changing the traditional way of doing business. Today, with the aid of neural networks and intelligent algorithms, AI technology is replacing human thinking ability with machine control and is doing **so** with greater accuracy and precision; a development that was thought impossible a few years back.

The American computer scientist Eliezer Yudkowsky argues that by far the greatest danger about artificial intelligence is that people conclude too early that they understand it. In truth, most people don't. For the record, AI and cars have a mutual history: indeed, it was the dream of scientists to create intelligent machines that could think and act for themselves, which gave birth to autonomous vehicles (or self-driving cars). **The latter** have turned out to become one of the best innovations of AI technology. Autonomous vehicles have neural networks and specific algorithms. These serve to detect objects, collect data, analyze objects, and make accurate decisions while on the road. These features also enable these intelligent machines to provide solutions to problems occurring in advance of real-time by predicting events through the swift processing of data.

Autonomous vehicles can predict a potential risk like a car collision ahead or behind and make the decision to avert it in real time. With good data collection sensors, these pieces of information are processed and results are obtained as actions. In addition to the neural network and specific algorithms, self-driving cars have five core components that help them optimize operation in real time, namely: computer vision, sensor fusion, localization, path planning, and control. They also have an enhanced degree of AI perception technology for detecting pedestrians, vehicles, cyclists, and work and obstacles that are 300 yards away. Indeed, an amazing technology.

Adapted from "AI and Autonomous Vehicles" by Chukwudozie J., https://www.iotforall.com/artificial-intelligence-and-autonomous-vehicles

I. TEXT COMPREHENSION *(09 marks)*

A) Among the 6 ideas listed in the following box, only 4 are mentioned in Paragraph 1. Read the paragraph, identify the 4 ideas, and write them on the lines below (1-2-3-4). *(02 marks)*

Robots controlling computers ❀ Definition of Artificial Intelligence ❀ Definition of Machine Learning ❀ Systems capable of thinking ❀ Systems playing essential roles ❀ Changes in business practices

1. _____ 2. _____

3. _____ 4. _____

.../…2

B) Read Paragraph 2 and indicate the correct correspondences between the elements listed in Column X and those in Column Y. *(02 marks)*

Column X	Column Y
5. Dream of scientists to create intelligent machines	**a)** Problem solving method
6. Neural networks and specific algorithms	**b)** Origin of autonomous cars
7. Detecting objects, collecting data, making accurate decisions	**c)** Importance of AI technology
8. Predicting events through the swift processing of data	**d)** Cars' artificial brains
	e) Role of artificial brains

Answer Box			
5.	**6.**	**7.**	**8.**

C) Use specific information from Paragraph 3 to complete the following statements. *(03 marks)*

9. The technological instruments used by autonomous vehicles to get pieces of information about road traffic conditions and predict potential risks are called _____.

10. Localization, path planning, and three other mechanisms contribute significantly in allowing self-driving cars to _____.

11. In order to detect people walking by the side of the road or riding bicycles, as well as obstacles 300 yards away, self-driving cars use _____.

D) Read Paragraphs 1 and 2 again. Then indicate WHAT the following words refer to. *(02 marks)*

12. "so" (Line 7): ☞ _____

13. "The latter" (Line 13): ☞ _____

II. LINGUISTIC and COMMUNICATIVE COMPETENCE *(07 marks)*

E) Combine each of the following sentence beginnings (14-17) with the correct sentence ending (a-e). One sentence ending will have NO MATCH. *(02 marks)*

Sentence Beginning	Sentence Ending
14. Autonomous cars rely on sensors, actuators, complex algorithms, machine…	**a)** …of sensors situated in different parts of the vehicle.
15. Autonomous cars create and maintain a map of their environment based on a variety…	**b)** …sends instructions to the car's actuators, which control acceleration.
16. Radar sensors monitor the position of nearby vehicles and video cameras detect traffic…	**c)** …measure distances, detect road edges, and identify lane markings.
17. Light detection and ranging sensors bounce pulses of lights off the car's environment to…	**d)** …learning systems, and powerful processors to execute software.
	e) …lights, read road signs, track other vehicles, and look for pedestrians.

Answer Box			
14.	**15.**	**16.**	**17.**

Adapted from https://www.synopsys.com/automotive/what-is-autonomous-car.html

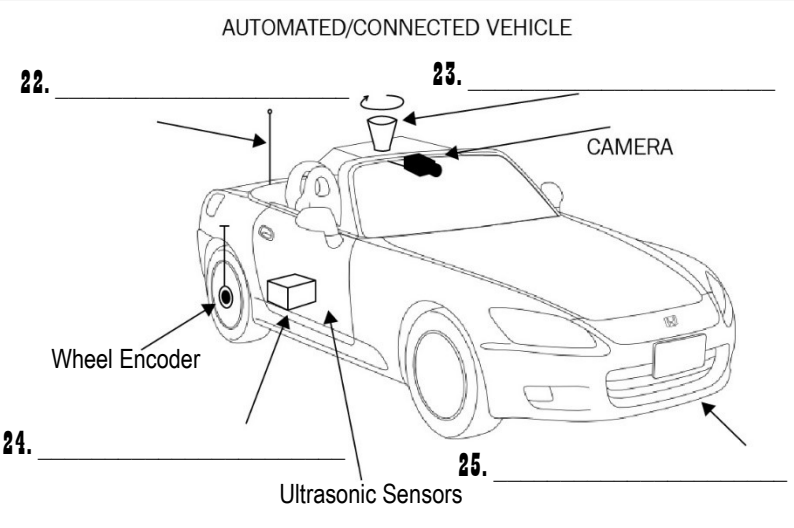
F) Complete the passage below with the correct options from the suggestions in parentheses. *(02 marks)*

Connected Automated Vehicles (CAVs) are expected to bring significant changes to how we travel and how traffic control devices operate. One can think that traffic lights may become obsolete and, therefore, can be (18) _____ *(displaced ❁ removed ❁ connected)* from intersections when all vehicles are connected and automated. How about when *only some* vehicles are automated? How about pedestrians and bicyclists? How about disruptions in communications? Some changes in (19) _____ *(in ❁ of ❁ for)* traffic lights may be necessary to accommodate this transition period from no, to all automated vehicles in the traffic stream. It may not be easy to change a protocol that (20) _____ *(is being ❁ is ❁ has been)* around for more than 100 years. Now let's think of how existing traffic lights work: they stop all conflicting movements except for one to avoid a collision, then stop that movement to allow (21) _____ *(another one ❁ one another ❁ each other)* to travel. As a result of this concept, the green time is switched between movements. This transition of green time from one movement to the next requires yellow and red signals, which lead to some lost time in each cycle.

Adapted from https://www.ahajbab.wordpress.ncsu.edu/research/cooperative-connected-automated-vehicle-control-in-transportation-facilities/

G) Read the descriptions of the following technologies for automated cars and complete the legend in the picture with the words and phrases in the box. *(03 marks)*

LIDAR ❁ Automotive Radar ❁ On-Board Unit ❁ GPS



LIDAR: From the top of the vehicle, this device tracks obstacles and other vehicles to maintain safe distances. It helps identify road signs, traffic signals.

Automotive Radar: Often located in the front of cars, this radio detection and ranging sensor uses radio waves to measure the positions and trajectories of vehicles, people, animals, and other objects around the car.

On-Board Unit: Hidden in the body of vehicles, this electronic device records traffic and driving data, and can connect to roadside and satellite navigation systems.

Global Positioning System (GPS): This is technology which uses real time geographical data received from several GPS satellites to calculate longitude, latitude, speed, and course to help navigate a car. It usually comes with an antenna that is positioned in the car trunk area.

Picture Source: https://static.packt-cdn.com/products/9781838649326/graphics/assets/630dfa33-b66a-4fc9-b38a-1a4e48729287.png

III. WRITING *(04 marks)*

Choose ONE topic and write between 100 and 150 words about it.

Topic 1: Former American software engineer Marc Andreessen once said, “Google is working on self-driving cars, and they seem to work. People are so bad at driving cars that computers don’t have to be that good to be much better.” Explain your understanding of this statement. Then give your opinion about it, using practical examples to support your view.

Topic 2: Artificial intelligence is now present in almost all aspects of human activity. Do you think it is possible to stop machines from taking control of our lives and dictating us what we should or should not do? Do you see more benefits than risks in the omnipresence of technology? Why?