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LEVEL: 6

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### Question ONE:

#### part a)

- The Kyoto Protocol applies to 6 green ~~gas~~ house gases, which are:  $\text{CO}_2$ ,  $\text{CH}_4$ ,  $\text{N}_2\text{O}$ , HFCs, PFCs, and  $\text{SF}_6$ .

- in force since 2005, including 41 countries plus the European Union, and below is an explanation of 3 mechanisms which have been stated in this protocol:

1) - Emission trading on the carbon market: also known as trading carbon credits and it allows the attainment of surplus for growing economies, where, the surplus is sold to those that exceed their quotas.

- Carbon offsets are measured in metric tonnes of  $\text{CO}_2$ , 1 carbon offset represents a reduction of 1 metric tonnes of  $\text{CO}_2$  or equivalents.

- This mechanism is also helpful in terms of GWP, which is Global Warming Potential, it is measured of how much heat the gas released in the atmosphere (100 years).

#### 2) - Clean development:

This mechanism is set to serve the following purposes:

- funding developing countries, which are the parties that are not included in the UNFCCC (United Nations Framework Convention on Climate Change) to find renewable and sustainable solutions

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### Part 1 (continue)

for climate control, such as alternative renewable energy sources.

- meeting the emission regulation for cars also help these countries in meeting their emission targets.

### 31. Joint development:

This mechanism is defined in article 6 of the Kyoto protocol, and it allows a country with an emission reduction commitment to earn reduction units (ERUs) from an emission removal project.

- it ~~is~~ is measured with an equivalent of 1 tonne of CO<sub>2</sub> per unit.

- it offers parties a flexible and cost-effective means of fulfilling a part of their Kyoto protocol commitment, while offer host parties benefits from foreign investment and the technology transfer.

Question ONE:part b1

This is a latest argument about whether carbon offsetting is a valid method to reduce carbon dioxide or not, some of the main arguments ~~of this~~ this mechanism can be highlighted below:

1- offsetting does not directly address emissions: at least not by buying offsets from the organisation while some of the emissions are still being emitted in other part of the world.

2- buying offsets is not reducing CO<sub>2</sub>: ~~not~~ companies that buy offsets are just buying their way out of their obligation. Companies that buy offsets they are just trying to commute to the protocol ~~as they~~ as they could not eliminate ~~the emissions~~ the emissions in the first place.

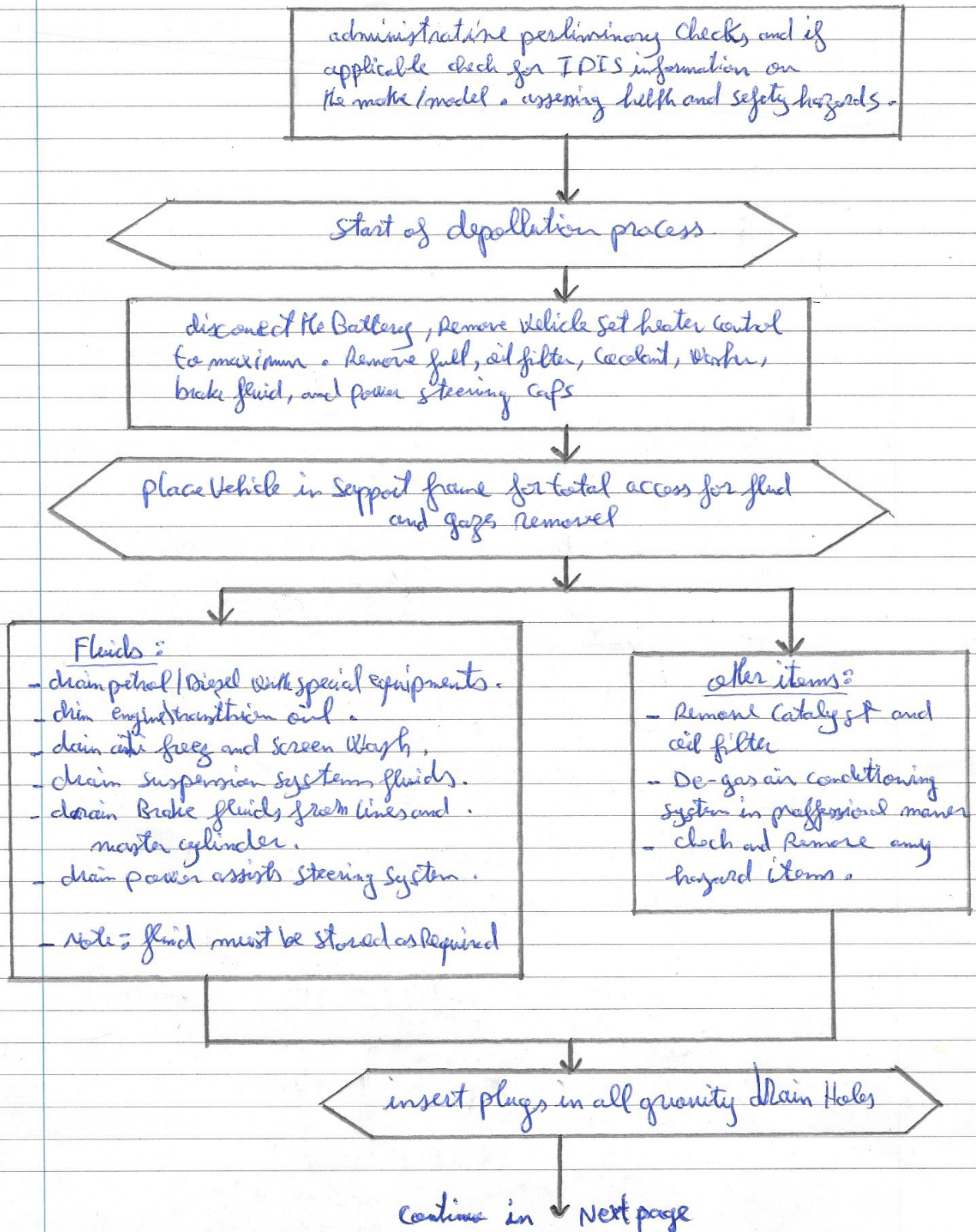
3- Carbon offsets contribute to global injustice: Some may say that by allowing rich to buy offsets, the mechanism end up exacerbating the injustice ~~caused~~ caused by climate change.

but in the other hand, the reality shows that the people suffering the most are typically those who are least responsible for the problem and least economically equipped to adapt to changes.

- With that being said, it can be argued that carbon offsetting can be effective and valid to a certain extent. However, some of the mechanisms in the protocol may not be as effective as others.

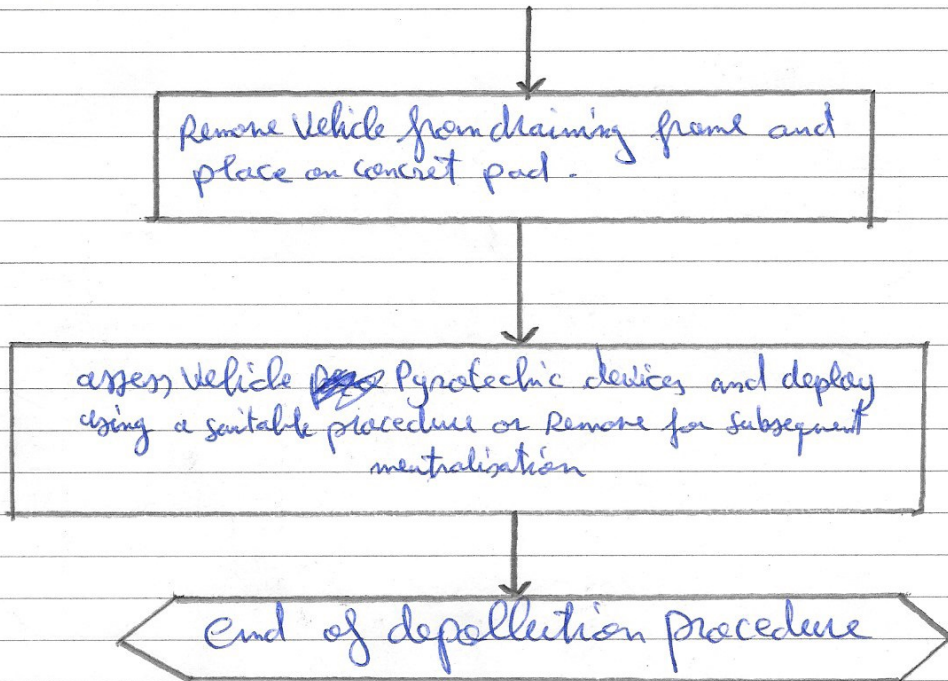
Question title:portal

depollution process process can be analysed in the following tree chart:



portal

depollution chart continued:



Question Two:Part b1

Below is the description of the five levels of automation plus the no automation level as stated by the SAE:

Level 0 (no automation)

- The full-time execution of the driving tasks by a human driver, even when enhanced by warning or intervention systems.

Examples: ABS, front collision (distance) warning, blind spot monitoring.

Level 1 (driver assistance)

- The execution by a driver assistance system of either steering or acceleration/deceleration (but only within a specific driving scenario). Example: Cruise control or Lane keep assist, Brake-controlled Park assist.

Level 2 (~~conditional~~ Partial automation)

- The execution by a driver assistance system of both steering ~~and~~ and acceleration/deceleration (but only within a specific driving scenario). Example: Adaptive Cruise Control and Lane keep assist, Autonomous Park assist.

Level 3 (~~conditional~~ Conditional automation)

The execution of multiple driver assistance systems of all ~~aspects~~ aspects of the driving task, However, the Human driver will respond to a request to intervene (But only within a specific driving scenario).

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- Example of level 3: Road train, Tesla model S "Auto pilot" feature.

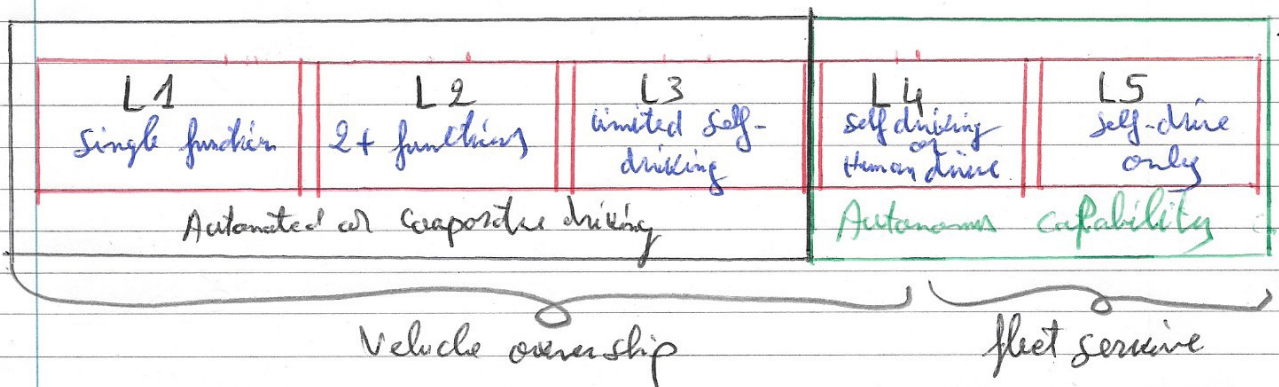
### Level '4' (High automation)

- The execution by multiple driver assistance systems of all aspects of the driving task, even if the human driver does not respond to a request to intervene (but only within a specific scenario). Example: Valet Parking, Highway Pilot.

### Level '5' (fully Automation)

The full time execution by multiple driver assistance systems of all aspects of the driving tasks, under all road/traffic and environmental conditions.

Example: ~~Robot~~ Robot TAXI, Google Car, Robot Racy



- The issues that could arise as a result of development of the level 3-5 in autonomous vehicle could be as follows:

### 1/ Loss of Jobs:

The ultimate goal of ~~Self~~ self-driving is to delegate the responsibility of driving to a machine. When fully autonomous vehicles are sold commercially, people that rely on driving for their incomes ~~may~~ may lose this form of livelihood. People who manage a fleet of ~~car~~ drivers may be terminated, alongside dedicated training facilities and services such as driving lessons and licenses.

### 2/ Moral Machine:

- Fully autonomous self-driving cars need to be able to make moral decisions, along with technical driving decisions.
- The first question is are self-driving cars capable of making ~~exist~~ moral judgement calls to the same level of a human being? If a person jumps in front of the car, and the car is left with the dilemma of hitting the person or swerving to the side, what will the car choose? The second question is, if the car is indeed capable of making moral decisions, should it be allowed to do so?

### 31 Criminal hacking:

- Car thieves used physical objects to unlock a car in the past. ~~Nowadays~~ Nowadays, thieves use technology to hack the car system.
  - Ironically, as cars become more sophisticated, their systems provide cybercriminals with more hacking opportunities.
- A cyber-Attack on a fully automated self-driving car, may lead to traffic jams, fatalities due to traffic accidents, ~~or~~ or even serve as an entry point to a local traffic system.