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Question 2

a) The end of life directive was implimeited by the european parliament which has been in place since 3rd of November 2003. The directive was te encourage reuse, recycling and recover of componentes of a vehicel at the end of its life. This directive was put in place to encourage increasing the use of recycled materials, Stopping contamination of components so the can be reused or recycled. The directive also specificed that all vehicles at end of life should hasve a certificate of destruction from an authorised treatment facility who must hold a current relavent permet.

- Depollution Process is the precautions taken to ensure harmful materials of the vehicle are delt with correctly. These materials include, gearbox, engine oil, brake fluid, air-con gas and any other harmful material which is found in the vehicle. The facility where the vehicle is depolluted have a specific guidlines for removing these harmful materials without them causing contamination to the enviroment, with all the materials being stored safely where it can be disposseed, recycled, reused or broken down correctly following regulations. ~~This stage is call prevention~~ The Depollution process can be clearly ~~on~~ in the diggram on page 3.

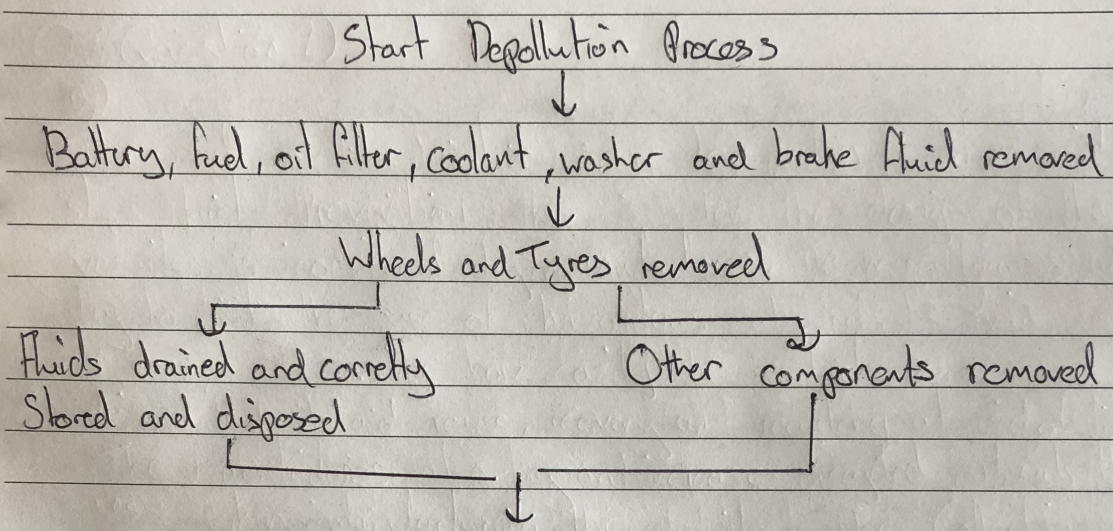
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Question 2)

a)

The end of life directive can be broken down into steps First Prevention, this is where the design of the vehicle is considered by manufactures. The manufactures will try to limit the use of hazardous substances to avoid disposing of them, The consider how easily the vehicle can be dissmantled to aid reuse, recovery and recycleng at end of life. The manufactures also try and increase recycled materials they use when manufacturing the vehicle. The Collection Phase specifies treatment facilities regulations and permits this includes ~~giving~~ issuing the owner of the vehicle with a certificate of destruction. Once the vehicle enters the treatment phase it will enter depollution followared by scrapping, during scrapping all harmful materials should of be removed, dissamembling of the vehicles various different materials comenses. Shredding is where all material ~~sha~~ such as a cars interior are reduced to the same size particle. Magnetic segnetic speration where all steels are seperated from plastics and synthetic materials. Sink float separation allows materials of different wight values to be seperated. a material with a density greater than $1 g/cm^3$ will sink to the bottom and a materail with a density less than $1 g/cm^3$ will float. Also Eddy current seperation can be used as a strong magnetic field will seperate non-ferrous metals from waste after all ferrous metals have been removed Previously by an arrangemat of magnets.

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b) Current autonomous vehicles are are identified by SAE J3016 with speaifies Six levels of driving autmation.

Level 0 has no automation the and has a full-time execution of driving task by a human driver, this level still includes aids such as ABS, traction controll and blind spot monitoring

Level 1 has driver assistance the driver has the execution of driving but with acceleration / deceltion and steering assistance such as lane assist and cruise Control.

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Question 2

b) Level 2 - Partial automation this execution by multiple driver assistance systems for both Steering, acceleration and decelleration but only with specific scenario's, such as Cruise controll, keep lane assist and brake controlled park assist.

Level 3 - is condinional automation this executed by mutiple driver assists for all aspects of driving tasks, however human response to a request to make a manoveor. These systems include Autopilot, automatic lane change, automatine distance or emergy braking

Level 4 is High automation where driver assist systems for all aspects of driving where human is not required to give a response for the vehicle to make an manovour. Such as Valet parking or highway pilot.

Level 5 is Full automation is consistes of multiple driver assistance systems of all aspects of driving tasks under all roadway and enviromental conditions, such as the google car and robot taxi.

Car based urban mobility is changing the automotive industry, with a predicted change to a on demand network where cars will be fleet owned and are used as a service. Autonous driving will cause distrup in the market espeically L4 + L5, However L5 presents stronyest opertunity for battery electric vehicle application.

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Question 2

b) The positive effects of L3-5

Decreased the number of accidents as atonomous prevent human error. Lessens traffic Jams as atonomous vehelee can accelerate and decceellerate in sink with other vehicles. Autonomous vehicle can park accuraey by its self removing human error and parking more efficently. Autonous vehicles gives the passenger more time to work of parform another activity. Atomous vehicles give more opertunties for disabled or older citizens who struggle to drive and assit safely to adestination.

The negative effects brought on by L3-5.

Safety and security issue, lots of systems and software could still have a unexpected glitch that may happen. The systems are also prone to hacking as a target, this may lead to possible collection of personal data. Fewer Job opertunites as this lard of autonomy could replace bus, taxi and truck drivers this can seriorly affect the economic growth of a country. Equipment or sensor failures still remain a possibility and there must be fail Safe systems in place other wise this could diffeetly result in accidents.

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Question 3

a) Snetterton Circuit introduced many noise deducing Strategies these included. Earth noise attenuation bund, measuring 5 meters in height around the circuit, these banks help deflect noise back towards the circuit whilst also giving a natural viewing point for spectators. A fence was also extreeted along the easten side to help deflect noise / contain noise. Un-silenced testing days were limitied to maximum of 31 days during one calender year, no more one un-licenceed day is permitted per week and no unsilenceed are permitted during weekends. On race weekends the testing and racing noise is govered by Motersport Uk who have specific noice limits for certain circumstances, following these guidlines will help cap noise of race vehicles. Drive by noise monitors are situated around the circuit to moniter race cars which are too loud and the vehicle can be removed from track. The circuit has strict opening hours to control when noise is produced with race car engines not allowed to be started before 8.30am. The circuit is limited to 4 class 3 meetings per yeare which is where the noise is allowed to be 118da. Snetterton has strict guidlines for air crafts landing at the circuit ensuring noise created by them is kept to a minimum. Snetterton will not operate a race meeting louder than class 1 whilst there is a church service in progress in local villages, the circuit manager speaks to the churches for dates of services.

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Question3)

a) The circuit has implmanted a noise manegmant & plan review annualy where they meet with the consil to discuss & feed back and current plan efficeneny and whether any changes are needed. This includes complaints and breaches.

b) Motorsport has been traster its tenology to the automotive industry for many years. With many manufactores have a dedicated motorsport deparment where new systems were developed and later transferred to a road car. For example in 2008 Williams developed an electromechanical hybrid energy- recovery system instead of a battery. The system was later bought by GKN Driveline and in 2014 lauched on 500 london buses. This teenology helped reduce emmisions and noise by london buses which are out the front of public seen automative vehicles.

Motorsport has always used vast amounts of data, are telementry before, during and after a race. Motorsport has developed the most advaree telemetry recoding and employ advaneeel simulation techriques. Simulation is key to reducing the cost and time of a vehicle in motorsport and automotive industry. The software and teeniques used in motorspor car be transferred to ~~motorspor~~ automotive industry as the

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Question 3

b) the use of hybrid and automous teorical software requires the processing of large quanities of data to all fucchonality.

Formula E has given the public perception of electric vehicles, their possitive inpact on the enviroment. With so many manufactures involved with Formula E it gives public perceptiain of how manufactures are using the same teanology in their road cars. Formula being awared ISO 20121 for sustainability of the chapionship and ~~with their~~ their carbon footprint. Gives a motorsport and Electric vehicles a possitive image in the public pareption. Giving the public a good understeand of the benefits of electric vehites and sustainability in motersport and automotive industry images.