

Question 3

b) The impact that new technology ~~has~~ in motorsport has on the auto industry is that it introduces new systems such as KERS on road vehicles. Manufacturers such as OPEL have adapted their road car into a rally car and are hoping to run a championship of EV's only. New technology will innovate automotive companies to come up with new designs and ideas. With the evolution of KERS in motorsport, Volvo have adapted their new 2020 XC90 with a KERS system using a brake-by-wire tech to recover energy during deceleration which is exactly the same as Formula E.

I also believe that using hybrid technology in WRC cars will advance the technology of manufactures and that they will adapt the technology into their road vehicles. Hyundai had the very popular I20 N as a replica of the WRC and TCR I30 N.

As a result of going hybrid the noise reduction will be a benefit as each circuit will be able to increase their capacity of vehicles and race meetings along with reducing emissions. The downfall to this will be more cost for manufacturers and it would take years to get hybrids into amateur rallying and racing. Some of the older fans of racing will not be attending races anymore because they used to smelling fuel and listening to roaring V12's.

Formula E have innovated many companies such as Jaguar where they have developed a KERS system. Aston Martin also followed on from Formula E by creating the RapidE concept car and Range Rover have also adapted Formula E technology to create a battery that will power the Evoque model.

Question 3

- a) Donnington race circuit use a variety of noise management plans to control the circuit. They've implemented a maximum of 60 race days in a year for cars with 108 decibels or less and 40 race days for cars with a 118 decibels. This controls the amount of noise it makes within a calendar year. They also police the noise tests as static and drive by tests on race days. NME is used on every race and track day at the circuit. To control rally days, Donnington ensure that no rally cars will run before 9 am and after 9 pm.

Nutts corner have addressed that track days will operate up to 3 consecutive days and no longer. They also state that circuit hours are between 10AM-9pm.

Snetterton have fitted three ~~elaborate~~ elevated viewing areas for fans which will act as bunding to reduce the noise coming from the circuit.

Another strategy circuits use is the public address system noise control. This will reduce the systems volume to the minimum level and the volume will be automatically reduced when there is no on-circuit activity.

Sound barriers made out of acoustifence have been used to reduce noise in other circuits. As well as this, the re-design of a race track could be a solution as the noisiest section could be moved away from the public. In regards to cost, the cheapest option would be attenuation bunds which can also increase spectator capacity such as has been done at Snetterton. Planting trees could reduce noise as they are a tall structure but they would take far too long to grow.

Question 2

- b) Auto industry currently at level 2 where ADAS is present. Going into level 3 will allow for more opportunities in engineering for the younger generation but will also have drawbacks with the advancement. Once the vehicles become all electric the fuel companies will see a shortage in sales therefore rising the prices. This advancement will also make modern vehicles very costly to both buy and service as there will be a shortage of knowledgeable people in the AV industry. Normal wage earners will have to wait until AV's become popular and built in mass production before they become affordable.
~~The automotive industry will have~~

Companies within the industry will have to catch along with the idea and also invest millions into designing these AV's. Along with this current employees will need specific training to be able to work on the cars and maybe, won't need as many workers as the intelligence of the vehicles become better they overcome human responsibilities.

As the autonomy increases in vehicles the need for workers such as taxi drivers, mechanics, bus drivers will decrease. The more technology that is implemented in the vehicles the more vulnerable they become to being hacked. Personal data along with manoeuvre manipulation can be done ~~then~~ by hackers as the vehicle is in motion. Along with technology issues come ethical issues. Companies such as Volvo have experienced a fatality whilst testing autonomy systems and Artificial Intelligence which is used, follows driver behaviour which isn't always lawful. Humans feed machines with data where they may have put someone's life at risk but an AV cannot do this if it is to be safe.

Question 2

b) Level 1 - Driver Assistance

The execution by a driver assistance system such as steering or acceleration/deceleration. These can only work within a specific driving scenario. Cruise control and lane keep assistance are level 1.

Level 2 - Partial automation

Multiple driver assistance systems of both acceleration/deceleration and steering. These can only work within a specific scenario of driving. Autonomous park assist and adaptive cruise control are level 2.

Level 3 - Conditional Automation

Multiple driver assistance systems of all aspects but the human must respond to a request and intervene within a specific driving scenario. Tesla Model S Auto pilot feature and road train.

Level 4 - High Automation

Multiple driver assistance systems of all aspects of the driving task even if the human does not respond to a request and intervene in a specific driving scenario. Highway pilot and valet parking.

Level 5 - Full automation

Full time execution by multiple assistance systems of all aspects of driving tasks. This is under all roadway and environmental conditions. Google car and Robot taxi are level 5.

Question 2

- a) The end of life directive was implemented by the European Parliament in the year 2000. This was done to encourage the reuse, recycling and recovery of components from a vehicle.

The end of life recycling process of a vehicle consists of different steps and procedures. A vehicle is collected or received by an Authorised treatment facility that will then carry some steps out where others will be done by specialists. Once this is done the ATF issues a certificate of destruction to the vehicle owner which can then be used as evidence for the vehicle being scrapped.

The depollution stage for a vehicle is where harmful substances are correctly stored and disposed of. The company will remove parts which can be cleared, recovered or sold. ATF's have specialist equipment developed to make the depollution stage safe and efficient.

Depollution Process

Start → Batteries, filters, oils, coolant, washer fluid and brake fluid

Wheels and tyres → Drain all fluids, store and dispose of safely and correctly
↓
other components

Plug all drain holes → assesment of other parts that remain

Once stripped the vehicle will be put into a shredder to fragment it.

Sustainability through Technology

M6X02212

14th May 2020

1pm - 3pm

Deion Atkinson

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