

2015 HIGHER SCHOOL CERTIFICATE EXAMINATION

**Automotive
Mechanical Technology****Section II****35 marks****Attempt Questions 16–21****Allow about 50 minutes for this section**

Answer the questions in the spaces provided. These spaces provide guidance for the expected length of response.

Question 16 (4 marks)

Ten litres of engine oil have been spilled on the workshop floor.

4

Outline how to clean up and dispose of the waste.

To clean up the spillage saw dust can be applied to the oil to soak up it up. Once completely soaked the oil/saw dust can be disposed in an industrial bin and ~~degreaser~~ degreaser is to be applied to the remaining oil residue left on the workshop floor. This will be in completely clean and remaining the oil from the ground, the degreaser must be disposed of in the correct manner, a specialised bin.

Question 17 (4 marks)

- (a) Where should a workshop dispose of trade waste water? 1

Trade waste water should not be disposed on the grass, but ~~either in a special drain or~~ ^{be kept in} ~~contained and~~ left to be collected by a specialised disposal company.

- (b) Outline TWO environmental consequences of incorrect trade waste disposal. 3

Many consequences can occur through this act. Firstly, if a workshop disposes the waste water outside on the grass, it can affect the nearby environment by introducing toxic chemicals to it and therefore killing any plants and taking habitats away from various animals. Secondly, if the water is simply poured down the drain sink, it can affect the water quality for from where it ends up, affecting the way certain animals and nearby plants/trees.

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**Automotive
Mechanical Technology****Section II (continued)****Question 18 (3 marks)**

All new vehicles registered in Australia need to be compliant with Australian Design Rules (ADR). **3**

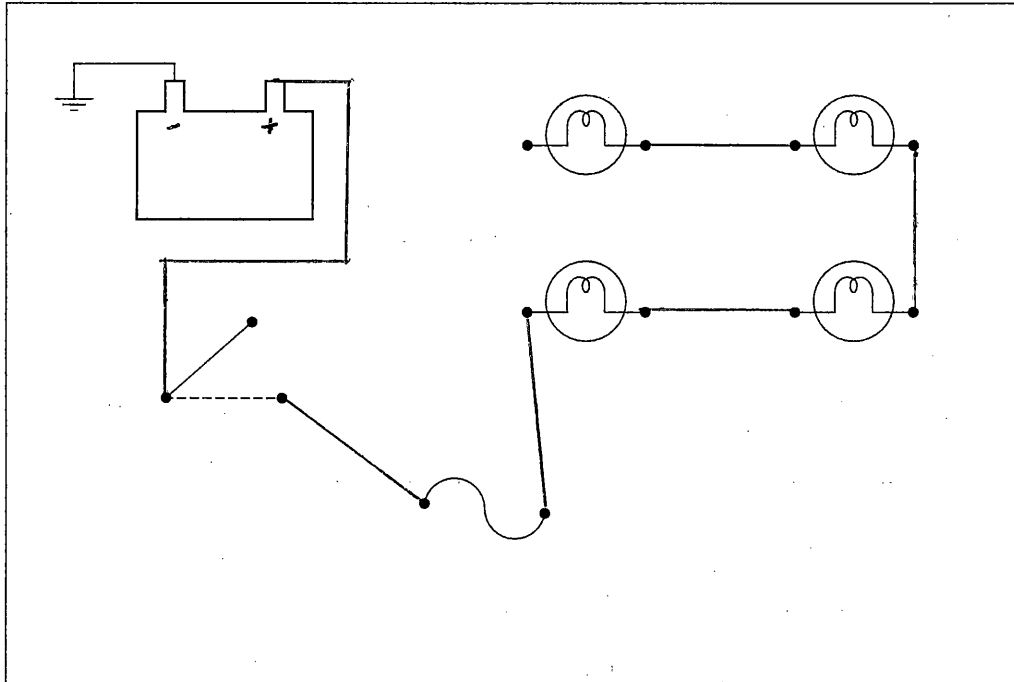
What is the purpose of these rules?

The Australian design rules are in place to provide Australia with regulated cars safe for the road. The purpose of the rules is to allow for new cars to have a certain safety rating, to follow strict emissions rules and to be efficient in power delivery and fuel efficiency, necessary to provide these factors to everyday road cars.

Question 19 (7 marks)

- (a) Construct a parking light circuit in the box below, using all the symbols provided.

5



- (b) Explain how you would use a voltmeter to test voltage drop to the parking/tail light circuit.

2

A voltmeter would test the voltage at the switch when turned ^{on} into a second reading would be after the fuse, and finally the voltage would be tested at each globe to find any possible voltage drops in the circuit.

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Automotive Mechanical Technology

Section II (continued)

Question 20 (8 marks)

- (a) Describe how the motor sport industry has influenced the development of vehicle brake technologies. 3

As motorsport technology is cutting edge, it influences advancements in road cars. Motorsports such as Formula 1 strive for the ultimate performance, disc brakes were used in motorsport as they are much more efficient at slowing the car down and are more reliable. This new technology was then implemented into road cars and was influential in its success.

- (b) Explain how an anti-lock braking system (ABS) prevents wheel lock-up in emergency braking conditions. 5

The anti-lock braking system is computerised and has an actuator that allows for anti-lock. In an emergency, to prevent an accident or, otherwise, the driver applies full brake pressure which will lock the wheels resulting in the car to skid and not being able to steer. The computer tells the actuator to apply brake pressure in bursts to allow the wheels to rotate. In return this ~~also~~ accounts for the car to slow down much faster and for the driver to have control over the steering of the car as the wheels are rotating and not locked up.

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Automotive

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Section II (continued)

Question 21 (9 marks)

- (a) Why should a workshop vice be left with a gap between the jaws when it is not in use? 1

To prevent wear as there is no point for pressure to be applied when there is no use in it.

- (b) Under what circumstances should the drilling speed be changed on a pedestal drill? 2

If the object being drilled is ~~increasing in temperature~~ beginning to move or showing signs of cracking/breaking. The speed should be changed to accommodate for this as the equipment may break and fail.

- (c) What precautions should be observed when using an electric welder in the workplace? 2

Precautions such as checking if any gas leaks are evident in the workshop, if any fuel or oil is on the floor or in the area, and to be wary of slipping hazards for fellow workers in the workplace.

Question 21 continues on page 16

Question 21 (continued)

- (d) Describe the advantages of using electric-powered tools compared with air-powered tools. 4

There are many advantages with electric powered tools compared to air tools, these are that electric tools are much quieter when in use. Electric tools only need to be charged to be used and when in use are very quiet, air tools in contrast are much louder and ear protection is advised in use, also a air compressor is used in most workshops. Its high level of noise can affect a worker's health over time and can result in deafness. Electric tools are becoming much more popular and can be purchased cheaper than air tools as a result of their efficiency and low volume noise.

End of Question 21