

## 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.

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**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.

Use a spill kit to contain the spill and isolate it from the rest of the workshop, making sure that none of the oil seeps into the ground or into storm water or sewage drains. Collect the spill into an appropriate container for storage in a sheltered, bonded area to minimise the risk of environmental damage if spillage occurs.

**Question 17** (4 marks)

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

Into a basin or drain that ~~the approved~~ leads to an approved trade waste water storage tank for recycling or extraction by approved professionals.

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

Trade waste water may be disposed of ~~all~~ down a storm water or sewage drain, which could ~~no~~ lead to a rural reservoir or lake that is used by ~~local~~ animals. This would ~~no~~ allow harmful chemicals to seep into the ground and be ingested by animals, causing ~~harm~~ harm to both the flora and fauna ~~ecosystem~~ ecosystem.

The chemicals within the trade waste water may not be suitable for the storm water ~~drains~~ or sewage piping, causing damage to them <sup>drain piping</sup> and allowing chemicals to seep into the ground underneath towns and rural areas, causing damage to the environment.

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

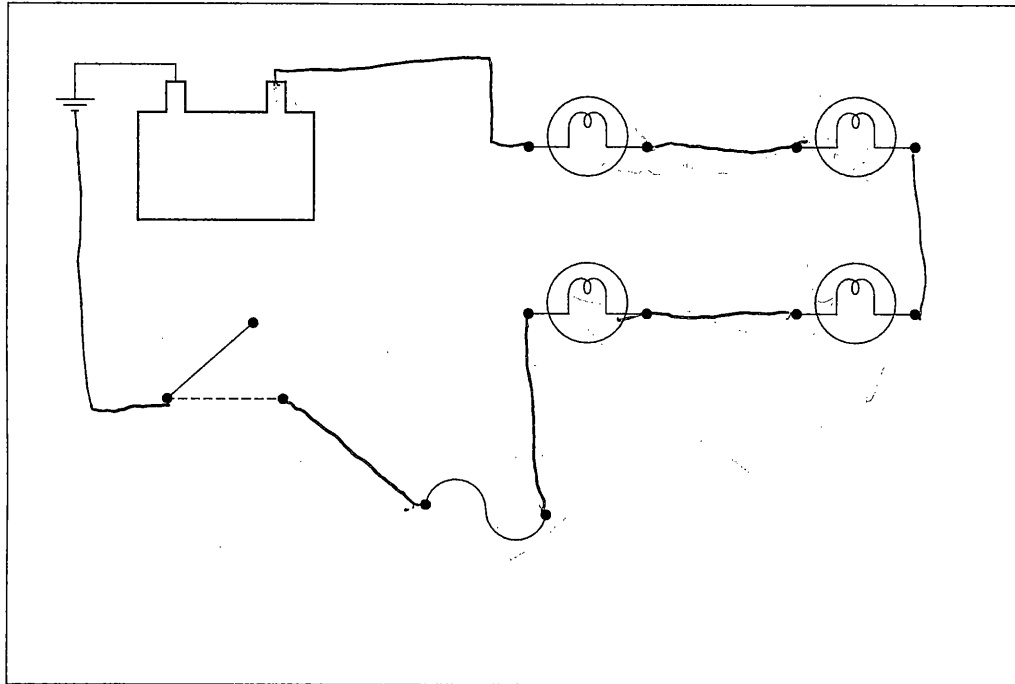
All new vehicles registered in Australia need to be compliant with Australian Design Rules (ADR). 3

What is the purpose of these rules?

The ADR are used to ensure that all vehicles registered in Australia meet both current safety standards and ~~the~~ current exhaust emission standards. All new cars also have to be compliant with current minimal fuel efficiency standards.

**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

Add a voltmeter to the circuit and record the volts as each light is added to the circuit. Divide the Amps ~~in~~ and the ohms.

## 2015 HIGHER SCHOOL CERTIFICATE EXAMINATION

**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**

The motor sport industry uses high performance and reliable brakes in the industry which has led to Intake manifold vacuum brake booster technology, drum brakes and anti-lock braking system technology that not only is used in the motor sport industry but also in commercial cars to improve safety and reliability in emergency braking situations.

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

The ABS records the current speed of all wheels independently, and sends this information to the brake controller. The brake pedal sensor also sends information to the brake controller to calculate the braking effort requested by the driver. The brake controller then applies pressure to each brake ~~independently~~ individually depending on the ~~braking~~ total braking force required and individual wheel rotational speed, thus preventing individual wheels locking up causing the driver to lose control of the vehicle.

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**Automotive  
Mechanical Technology****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**

In order to avoid damage to the vice over a long period of time.

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

The drilling speed on a pedestal drill should be changed ~~depend~~ depending on the material ~~of the~~ being drilled. A ~~at~~ more dense material requires a faster ~~dr~~ drilling speed.

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

Protective clothing should be used ~~so~~ such as overalls, gloves and welder's mask. This will reduce the risk of any personal dangers that are present due to the welder.

**Question 21 continues on page 16**

## Question 21 (continued)

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

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Electric powered tools are much more mobile than air-powered tools due to the electric battery that powers the electric tools. Air-powered tools always need to be connected to an air supply which can be inconvenient and pose as a safety hazard. Electric power tools also have the liberty of variable power settings. This allows the tools to operate at different speeds or powers whereas air-powered tools only have the one setting.

**End of Question 21**