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.

Once the oil has been spilt immediately contain the area / spill with a spill kit which should be near by. Bund the area so the oil cannot spread further. If applicable place earth on the spill to help soak up the engine oil and notify the foreman or supervisor as the spill should be reported. Clean up the earth placed over the spill and place in a hazardous waste bin in a bunded + under cover area. The waste should be collected by an approved and licensed waste collector. The floor can then be mopped to prevent falls + slips or if the surface is still slippery.

Question 17 (4 marks)

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

Trade waste water after being filtered and passed through an oil/water Separator can be disposed of down the drain (sewer) Not stormwater

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

Incorrect waste disposal can have consequences on not just a workshop but numerous environmental consequences. ~~These~~ incorrect waste disposal can include pollution through litter, unattended spills or unattended run off into the environment. Environmental Consequences for incorrect trade waste disposal can include:
1) Reduction of plants and animals due to environmental waste, e.g runoff can increase soil salinity or pollution can be consumed by animals killing them.
2) reduction of water quality in river systems which can result in toxic contamination in ecosystemit effect & broader society.

2015 HIGHER SCHOOL CERTIFICATE EXAMINATION

Automotive
Mechanical Technology

Section II (continued)

Question 18 (3 marks)

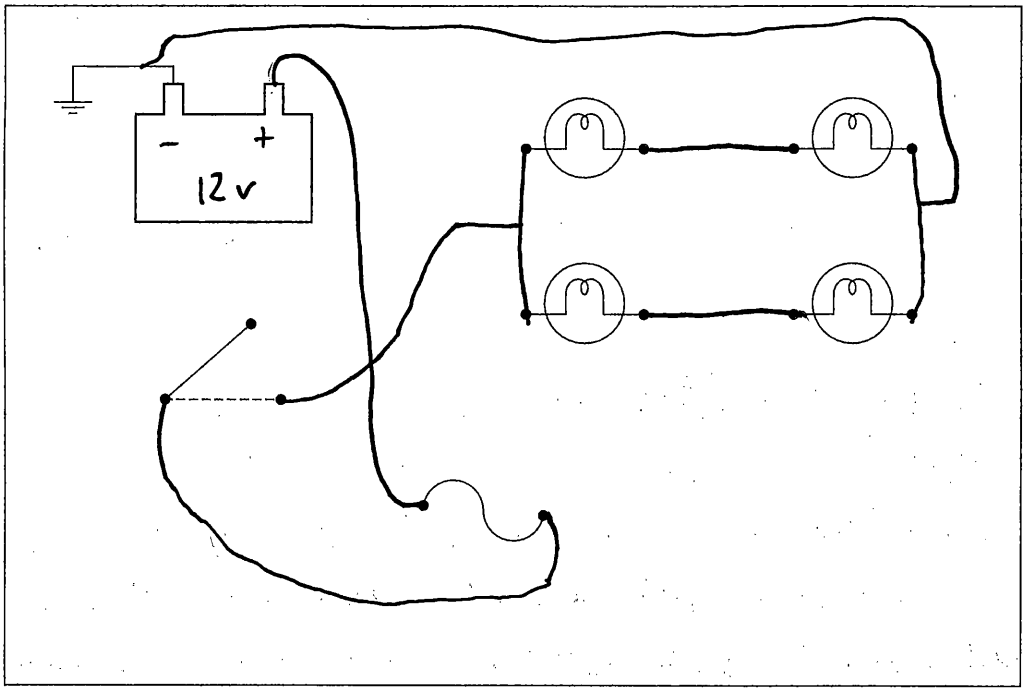
All new vehicles registered in Australia need to be compliant with Australian Design Rules (ADR). **3**

What is the purpose of these rules?

Australian design Rules (ADR) are rules which a vehicle must comply to. The rules outline Manufacturing Standards and help to ensure and promote vehicles are safe for the driver to drive and are also complying with environmental Standards. These rules will ultimately make the roads safer and help to promote environmental Sustainability and safety.

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 volt meter should not be connected as part of the circuit. It is possible to gain a voltage drop reading from firstly testing the voltage output of the battery with the voltmeter and then connecting the voltmeter to the wiver after/at the parking/ tail lights. A change in voltage can indicate a voltage drop. Safety precautions should be adhered to. e.g safety glasses, no jewellery to be worn.

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 motoring industry currently uses regenerative braking systems in hybrid vehicles. The system charges a battery source when their is a lose of energy i.e (Braking) spins generator charging battery. Modern supercars utilises carbon ceramic brake discs in increasing efficency and braking force.

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

Anti-lock braking systems prevent the lose of vehicle traction upon sudden braking. The ABS system monitors the speed of each wheel individually using magnetic pulses (sensors) or a guided laser. Upon a sudden change in speed, sensors relay information towards the ECU where digital signals [redacted] are analysed and changed to allow for the wheels of the vehicle to move. This creates traction and increases passenger safety under heavy braking.

2015 HIGHER SCHOOL CERTIFICATE EXAMINATION

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**

Rapid change in temperatures daytime/ overnight can cause the vice to expand contract and stick together. (Alternate grooves in vice)

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

* Dependant on the material drilling in the situation ie (Wood, Cast Iron, Steel)
* The quantity of holes needed to be drilled (Increase holes, Increase Speed)

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

Ensuring that all participats within the area have a welding helmet or goggles to prevent welders flash. Notify surrounding civilians colleges in the creation of flying sparks and debris. Aquire appropriate PPE.

Question 21 continues on page 16

Question 21 (continued)

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

Electric-powered tools can be altered more easily and change various settings easier. More versitile in use allows technicians to move around more freely without the connection of an air-line. No need for financially expensive (with costly) compressors ($$$) uses its own battery source. Less maintenance is required no need for check oil lines relieving pressure with compressed air devices (More reliable)

End of Question 21

More reliable cheaper source of power.