



2010 HSC Automotive Sample Answers

Section II

This document contains ‘sample answers’, or, in the case of some questions, ‘answers could include’. These are developed by the examination committee for two purposes. The committee does this:

- (a) as part of the development of the examination paper to ensure the questions will effectively assess students’ knowledge and skills, and
- (b) in order to provide some advice to the Supervisor of Marking about the nature and scope of the responses expected of students.

The ‘sample answers’ or similar advice are not intended to be exemplary or even complete answers or responses. As they are part of the examination committee’s ‘working document’, they may contain typographical errors, omissions, or only some of the possible correct answers.

Question 16***Sample answer/Answers could include:***

Computer based technologies can greatly improve the efficiency of an automotive workshop. For example, through implementing various technologies, work can be minimised as well as completed in a more timely manner.

Ways in which such technologies can improve efficiency are:

- online ordering of parts, e.g. will reduce administration time
- digital workshop manuals/ technical specifications manuals, e.g. current up to date information
- recording customer details
- calculating job costing
- stock/inventory control
- permanent retention of job cards, e.g. service history readily accessible
- automation of tasks (wheel balancing etc)

Software which may be used are:

- spreadsheets
- databases
- word processing
- internet/ world wide web
- online user manuals
- communication between shop, suppliers and or customers
- scan tools for diagnostic purposes
- use of email to order parts, manage clients, contact suppliers

Question 17 (a)

Sample answer/Answers could include:

- Talk/ communicate with your direct supervisor
- Fill out incident report or workplace injury form
- Log the incident in the OHS booklet with first aid
- Tell the OHS officer how the incident occurred and log your statement
- Seek medical advice if required from a G.P and obtain a workcover certificate

Question 17 (b)

Sample answer/Answers could include:

- The Australian Apprenticeships Centres (AAC) and ‘branches’ or ‘offices’ specifically named

Question 17 (c)

Sample answer/Answers could include:

Procedure process chart with location assembly area should be posted in each room with the relevant evacuation guide to the nearest exit points.

The evacuation procedure should be practised as a drill and should incorporate:

- head check at the designated assembly area
- walk within marked areas
- walk in a line to an assembly area,
- make sure all people have been informed either through an alert bell or verbal instruction
- evacuate by the nearest safe fire exit, closing all doors behind you, do not use lifts

Question 18 (a)***Sample answer/Answers could include:***

Safely raising a vehicle on a trolley jack requires:

- Work area and surroundings to be clear, clean and safe
- Turn off ignition
- Follow S.O.P.s
- Car is to be on level ground,
- Handbrake is engaged
- Car should be “chocked” securely, especially if park brake is inappropriate
- Safe Weight Load is determined
- Check jack for suitable SWL capacity
- Check jack is in correct operating order. Particularly look for seal leaks
- Lift the vehicle of specific jacking point
- Jack stands or axle stands are used to support the vehicle weight before work is commenced

Question 18 (b)***Sample answer/Answers could include:***

- It is important to progressively tighten and within a set sequence to ensure the material used doesn't warp or cause deflection. Also, the relevant tension of the fasteners will not be accurate if they are not tensioned within the correct progression.

Question 18 (c)***Sample answer/Answers could include:***

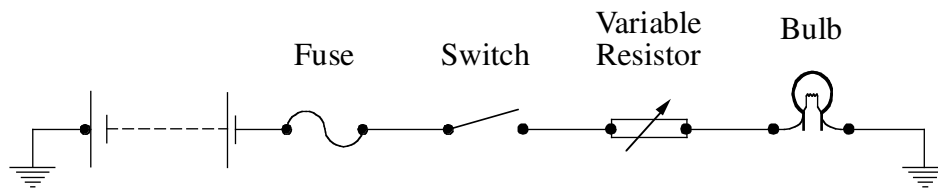
- The tool shown is a Torque wrench/tension wrench. It is used to tighten a fastener to a specified tension.

Question 19 (a)***Sample answer/Answers could include:***

- (i) Positive plate – lead oxide or lead peroxide
- (ii) Negative plate – spongy lead
- (iii) Electrolyte – sulphuric acid

Question 19 (b)

Sample answer/Answers could include:



NOTE: other technical symbols will be accepted.

Question 20 (a)

Sample answer/Answers could include:

Examples of materials used are:

- Aluminium
 - cylinder heads
 - engine blocks
 - bonnets/boot lids/doors
 - bumper bar reinforcements
 - wheels/various components
 - Carbon fibre
 - trims
 - dashboards
 - spoilers/ bonnets
 - seat construction
 - bumper absorption/ reinforcements
 - some external body panels
 - Polymers/ plastics
 - bumpers/spoilers
 - trims
 - engine covers/ cowlings/ intake piperwork/ cold air intakes etc
 - dash components
 - interior systems
- High Speed Steel (HSS), Light weight steel
 - Titanium
 - Fibreglass/ Glass
 - Perspex

Question 20 (b)

Sample answer/Answers could include:

- Paint Code, paint information located on the V.I.N plate in the engine bay

Question 20 (c)

Sample answer/Answers could include:

Supplementary Restraint System (SRS) or Air bag and/or Pre-tensioned seat belts

Question 21 (a)***Sample answer/Answers could include:***

The damaged suspension unit will cause a range of problems. These include:

- Components
 - tyre scrub/ increased tyre wear
 - extra stress on stub axle and adjoining suspension components
 - possible fatiguing of ball joint, tie rod and/ or stabiliser bar
 - shock absorber seals will be placed under excessive strain and could leak oil
 - lower control and could be bent
 - damage to wheel bearings
 - McPherson strut could be bent and require replacing
 - strut tower could be bent and require re-alignment
- Geometry will be affected
 - poor handling and instability
 - poor turning circle
 - vehicle may over-steer or under-steer depending on the turning direction
 - vehicle will not hold line may pull to the left or right
 - toe-in will be affected
 - damage will result in excessive resetting after replacement of damaged components
 - wheel alignment will require resetting after replacement of damaged components

Question 21 (b)***Sample answer/Answers could include:***

- Check air filter
- Check oil level
- Release moisture through release valve
- Fit drier
- Fit oil/water separator
- Fit regulator separator
- Fit water condenser
- Must be regularly inspected and drained

Section III

Question 22

Sample answer/Answers could include:

Employees and employers both share the responsibilities for maintaining and upholding the OHS requirements as set by the OHS Act (2000).

Examples of employees' responsibilities are as follows:

- To ensure compliance to PPE requirements at all times
- To be cooperative with employer and fellow employees
- To implement and follow the appropriate S.O.P when using equipment
- To report any hazards to the appropriate supervisor
- To use ONLY the correct tool or procedure for the required job
- To follow relevant M.S.D.S
- Be aware and familiarised with fire-safety procedures
- Be aware and conscious of the applicable workplace evacuation procedure
- To minimise potential hazards with all tasks
- To ensure they are fully compliant and sufficiently trained to perform the relevant tasks
- To ensure they have been sufficiently inducted into the work site
- To ensure the correct methods are implemented through manual handling. This includes the suitable use of mechanical aids
- To maintain a clean and tidy workplace
- To ensure no trip hazards are created through the process of their work
- To thoroughly check the condition of tools and equipment before use. In particular with mechanical aids
- To follow a risk analysis with all activities.
- Where possible, avoid repetitive tasks which can cause an R.S.I risk
- Workers must avoid unnecessary noise hazards
- In the event of an inhalation hazard, workers must ensure they provide adequate ventilation and inform colleagues of the hazard
- To apply the appropriate spill kits where necessary (avoid slip hazards)

Failure of following the above responsibilities may lead to employees being prosecuted by Work Cover.

Employees should ensure they are familiar with all of the associated hazards within their work site. If they are unsure as to such hazards or how to minimise such hazards, they should speak to the relevant OHS officer and or request a further site induction.

In circumstances where employees feel their work-site is not adhering to OHS, and discussions with employer and/or supervisor has failed, the employees should refuse to complete the problematic tasks. They can contact WorkCover and/or their associated Union to resolve the matter.

Section IV

Question 23 (a)

Sample answer/Answers could include:

The Federal, State and Local governments each have laws and regulations with which the automotive industry must comply. The Environment Protection and Heritage Council (EPHC) is the federal body with the responsibility of setting and monitoring national environmental standards. It is also responsible for monitoring Australia's compliance with international conventions that Australia has agreed to.

Each state has environmental legislation and an Environment Protection Authority (EPA) to administer these regulations. Penalties, such as heavy fines or imprisonment, can be enforced on corporations or individuals for serious breaches of any legislation. Costs for cleaning up and remedial work can also be charged to offenders.

Local councils, water supply authorities, waterways authorities and police may also issue penalty infringement notices (on the spot fines) for certain offences

Question 23 (b)

Sample answer/Answers could include:

Trade Waste Water

- Do not allow anything other than clean rainwater to enter the stormwater drains on or near your premises.
- Prevent any washing water from entering stormwater drains. Confine your cleaning and washing to a contained or bunded area where the wastewater is directed to the sewer
- Do not hose the workfloor or forecourt unless all the water can be collected or directed through an approved trade waste system. Do not allow any contaminated water to enter the stormwater system
- If you cannot hose without getting dirty water in gutters or stormwater drains, there are other cleaning options:
 - sweep or vacuum the area
 - use absorbent material to remove most of the grime and then use some solvent on a rag to remove the rest.
- Wash vehicles and parts only in an approved wash bay. Ask your local council for approval to install a wash bay.

Waste Management (Materials)

- First reduce your use of materials. Apart from anything else, this saves you money.
- Second, reuse materials. This saves more money.
- Third, send materials off to be recycled. This preserves scarce resources.
- Last, only when you have tried the first three options should you dispose of material.
- Separate your wastes. Mixing wastes may make them unsuitable for reuse or recycling.
- Clearly label waste containers and put them in convenient areas to encourage their use.
- Reduce your waste disposal costs by buying products from suppliers that provide a collection, reuse or refill service for containers.

- Drain any liquid from metal waste before placing the waste in bins provided by waste metal recyclers.
- Alternatively, store the waste in the work area and take it to the recyclers regularly. Storage containers must not leak.
- Almost all car parts can be broken down into aluminum, copper, iron, steel and other metals. Most metal recyclers will pay you for sorted metals, although most do not pick up.
- Tyres are a significant problem waste and can no longer be disposed of to landfill. You must not put old tyres with your other industrial waste for disposal.
- Many tyres can be retreaded or recapped. This is an important alternative to landfilling.
- Tyre pick-up for reuse or recycling will cost you approximately \$1 per tyre. If you add this to the cost of your new tyres, customers will be prepared to pay if they understand that the old tyres will be disposed of in an environmentally acceptable manner.
- Store radiators awaiting disposal or exchange inside the workshop or under cover to reduce the risk of zinc or residual coolant washing into the soil and the stormwater system.

Hazardous Materials (Chemicals)

- Ensure that all chemicals are stored in a designated area away from stormwater drains. Cover, seal and bund the storage area.
- Bund storage areas to contain spills and cover them to prevent rusting of drums. There must be no access for any spills or leaks to drains. Protect drums and tanks from possible collision. Place drip trays where leakage is likely.
- Store empty drums, old engines, gearboxes, differentials and so on in a covered or banded area because of the risk of leakage of residual oil. Have them removed as soon as possible. Seal drums awaiting collection and store them upright.
- Store and dispose of each type of chemical in a separate container. Clearly label each container with the name of the chemical it contains.
- Inspect storage containers regularly. Replace them if they are rusted, damaged or likely to leak. Allow yourself easy access.
- Keep all sharp parts away from chemical or liquid containers to avoid damage and spills.
- Send all used chemicals to a licensed contractor for recycling or disposal.
- Clean up all spills immediately. Have a spill kit in a clearly labelled and easily accessible place in the workshop.
- Solvents tend to be highly volatile and flammable. Store them away from heat, naked flames, direct sunlight, oil and other flammable liquids. Avoid unnecessary human exposure to solvents by storing them in a covered container with a tap (to avoid the need to pour). Keep the storage area well ventilated.
- Collect waste oil for recycling. You must not tip old oil down the sewer or stormwater drains, on the ground or into trenches.

Air Quality Management

- CFCs and HCFCs are controlled by the NSW Ozone Protection Regulation 1997, which bans venting of CFCs and HCFCs (including blends) and requires them to be recovered for recycling during servicing or decommissioning. You could be prosecuted and fined for deliberately releasing CFCs or HCFCs.
- Persons installing, servicing or decommissioning vehicle air conditioners that use CFCs or HCFCs must be authorised by the Motor Vehicle Repair Industry Council (MVRIC).
- Avoid unnecessary exposure to solvents by storing them in a covered container with a tap (to avoid the need to pour). Keep the storage area well ventilated.

- Ensure that containers are kept closed when not in use. This will limit evaporation and unnecessary loss of solvent.
- Use water-based or biodegradable strippers, cleaners or degreasers whenever possible. These are less harmful to you and the environment.
- Use a dedicated parts cleaner with a lid. Allow parts to drip-dry before removing them. Place the parts on a rack over the tank for best drainage.
- Avoid spraying solvent. Use only a steady stream or brush to gently agitate the parts being cleaned.
- Do not clean brakes with compressed air, as this creates a fine dust. Asbestos is still present in some brake pads as well, creating a potential health risk to employees and neighbours. Find a less harmful method of cleaning your brakes. For example, vacuum them or wipe them down with a damp cloth.
- Dust from your premises may contain heavy metals or other toxic substances that can cause serious health problems for staff, customers and the community. Reduce windblown dust from your premises.
- Do all surface cleaning and preparation on a concrete-paved area that is covered and bunded. Prevent the escape of dust from this area. Use a wet cloth or sponge and a bucket to minimise it.
- Place floor sweeping dust in a bag or cardboard box before putting it into an industrial waste bin. This stops the dust from becoming airborne when the bin is emptied.
- Check the gas cylinder daily to ensure that there are no minor leaks or that the bottle has not been left partially open. Fence-in large tanks to prevent tampering.

Noise Management

- Do not rev motor vehicle engines excessively when starting a car or to test repairs or tuning.
- Reduce machinery noise and regularly maintaining equipment. House machines on rubber, and surround them with solid brick walls.
- Reduce the offensive noise of compressors by:
 - enclosing them with a material that will muffle sound
 - placing them in a back room and keeping the door shut (as long as there is adequate ventilation)
 - fitting silencers on the inlet and exhaust
 - maintaining them regularly
- Avoid after-hours work. If you have to work after-hours, make every effort to reduce noise. For example, keep the doors shut and keep panel beating to an absolute minimum. Legislation limits the amount of noise permitted and when it is permitted.
- Avoid the use of extension telephone bells and public address systems.