

2018 HSC Automotive Vehicle Body Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	A
2	D
3	C
4	D
5	A
6	D
7	A
8	B
9	B
10	B
11	B
12	C
13	A
14	C
15	B

Section II

Question 16 (a)

Criteria	Marks
• Describes a range of advantages vehicle manufacturers gain in adopting the use of plastic body panels, using correct industry terminology	3
• Describes some advantages vehicle manufacturers gain in adopting the use of plastic body panels, using some industry terminology	2
• Identifies one advantage vehicle manufacturers gain in adopting the use of plastic body panels	1

Sample answer:

Manufacturers gained many advantages when changing to plastic body panels. Vehicles were lighter, more aerodynamic, streamlined, able to be painted easily and had improved impact zones. Manufacturers could also easily change the appearance of their vehicles between models and upgrades.

Question 16 (b)

Criteria	Marks
• Provides a thorough description of how plastic panels are repaired differently to metal panels	4
• Provides a sound description of how plastic panels are repaired differently to metal panels	3
• Provides some description of how plastic panels are repaired differently to metal panels	2
• Provides a description of plastic panels or metal panels repair	1

Sample answer:

Plastic panels withstand impact so often only paint repair is required. Panels can be plastic welded or have an epoxy resin. Painting plastics requires a primer adhesive which can then be finished as normal. Metal panels often require extensive repair including panelbeating, shrinking and/or cutting and welding prior to finishing.

Question 17 (a)

Criteria	Marks
<ul style="list-style-type: none"> Provides a clear description of the systematic approach to disassembling a vehicle, using precise industry methodology 	3
<ul style="list-style-type: none"> Provides some description of the systematic approach to disassembling a vehicle, using industry methodology 	2
<ul style="list-style-type: none"> Provides a basic description of vehicle disassembly 	1

Sample answer:

A vehicle being disassembled firstly should have photos taken of all adjacent components that are to be removed.

All parts to be removed are tagged and all hardware either refitted or bagged with the parts. Notes taken of any unique or hidden fixings.

Storage of all components in storage area to keep parts together and easy to access.

Question 17 (b)

Criteria	Marks
<ul style="list-style-type: none"> Provides a clear and comprehensive list of steps to ensure a vehicle is reassembled quickly and efficiently Uses industry terminology 	4
<ul style="list-style-type: none"> Provides a clear list of steps to ensure a vehicle is reassembled quickly and efficiently Uses industry terminology 	2–3
<ul style="list-style-type: none"> Provides some steps to ensure a vehicle is reassembled quickly and efficiently 	1

Sample answer:

Before reassembly the following steps need to be observed so that a vehicle is reassembled quickly:

- Clean vehicle
- Clean work area
- Position vehicle for ease of access
- Lay out parts in order of replacement
- Locate any specialised tools, consumables, equipment
- Review any notes, photographs etc
- Apply vehicle covers to protect adjacent areas.

Question 18 (a)

Criteria	Marks
• Correctly names BOTH spray guns	2
• Correctly names ONE spray gun	1

Sample answer:

Suction spray gun, gravity spray gun

Question 18 (b)

Criteria	Marks
<ul style="list-style-type: none"> Names the TWO dials on the spray guns correctly Uses correct industry terminology to identify the dials' uses Provides a logical and reasoned response 	4
<ul style="list-style-type: none"> Names at least ONE of the spray guns correctly Uses some industry terminology to identify the dials' uses Provides a reasoned response 	2–3
<ul style="list-style-type: none"> Names at least ONE of the spray guns correctly Uses limited industry terminology to identify the dials' uses Provides a basic response 	1

Sample answer:

The top dial adjustment is to adjust the width of the spray at the nozzle.

The bottom dial adjusts the amount of fluid sprayed out of the nozzle.

Both dials need to be set to suit the painter, the type of paint, air pressure and the work being done.

Question 19 (a)

Criteria	Marks
• States the danger of working with high voltage	1

Sample answer:

Be aware of high operating voltages of HID globes as this could cause death.

Question 19 (b)

Criteria	Marks
<ul style="list-style-type: none"> Provides a sound description of how an electrical circuit is tested for correct operating voltage 	3
<ul style="list-style-type: none"> Provides some description of how an electrical circuit is tested for correct operating voltage 	2
<ul style="list-style-type: none"> Demonstrates a limited understanding of how an electrical circuit is tested for correct operating voltage 	1

Sample answer:

The following tools and process are used to determine the amount of voltage drop:

- use a multimeter
- use workshop specifications
- test battery reference voltage
- test supply voltage
- test circuit earth points
- calculate voltage drop using the difference obtained between the reference and load voltages.

Question 19 (c)

Criteria	Marks
<ul style="list-style-type: none"> Provides a thorough description of how a wiring diagram is used in the troubleshooting process when diagnosing a fault Uses correct industry terminology 	4
<ul style="list-style-type: none"> Provides a sound description of how a wiring diagram is used in the troubleshooting process when diagnosing a fault Uses basic industry terminology 	2–3
<ul style="list-style-type: none"> Provides a basic description of a wiring diagram 	1

Sample answer:

A wiring diagram is the first place you should go to when identifying an electrical fault. The reasons for this are to quickly locate:

- power supplies
- earth positions
- plug locations
- electrical component locations
- harness secure points.

This gives the technician a 'road map' to follow to speed up processes in diagnosing.

Question 20 (a)

Criteria	Marks
<ul style="list-style-type: none"> Clearly explains the initial checks to identify if a vehicle's wheels are aligned prior to placing the vehicle on a wheel alignment machine Uses industry terminology 	3
<ul style="list-style-type: none"> Provides some explanation of the initial checks to identify if a vehicle's wheels are aligned prior to placing the vehicle on a wheel alignment machine Uses some industry terminology 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

The initial visual and physical checks that could be used to identify if a vehicle's wheels are aligned prior to placing the vehicle on a wheel alignment machine include:

- bearing damage/free play
- suspension damage
- bush damage/play
- steering linkage/rack damage.

Question 20 (b)

Criteria	Marks
<ul style="list-style-type: none"> Provides a thorough explanation of the diagnostic process to identify FOUR components related to the damaged area Uses industry terminology 	4
<ul style="list-style-type: none"> Provides a sound explanation of the diagnostic process to identify TWO to THREE components related to the damaged area Uses some industry terminology 	2–3
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

The diagnostic process to assess four related steering and suspension components that would be damaged due to the accident would include initially visually inspecting the vehicle while stationary for damaged components.

The vehicle would need to be raised. The components that could be checked include (any FOUR):

- lower control arm for bend
- ball joint for freeplay
- tie rod for bend and toe
- strut/shock absorber tested for bounce and rebound and visually inspected for bend
- wheel bearing for excessive noise and freeplay
- lower control arm for physical damage and damaged fixture points.

Section III

Question 21 (a)

Criteria	Marks
<ul style="list-style-type: none"> Provides a sequential and comprehensive description of the procedures to be carried out on vehicle prior to the metal work Uses specific industry terminology 	7
<ul style="list-style-type: none"> Provides a sequential description of the procedures to be carried out on the vehicle prior to the metal work Uses industry terminology 	5–6
<ul style="list-style-type: none"> Provides a mostly sequential description of the procedures to be carried out on the vehicle prior to the metal work Uses some industry terminology 	3–4
<ul style="list-style-type: none"> Outlines a basic procedure to be carried out on the vehicle prior to the metal work 	1–2

Answers could include:

A vehicle about to have a replacement rear quarter panel firstly needs to have the area cleaned and disassembled of all adjacent components. For the body this could include inner fender panels, wheel arch moulds, side marker lights, side skirts, lock mechanisms, adjacent doors, windows and/or window trim. The vehicle will also need: removal of interior panels, rear compartment linings, any noise suppression insulation materials; relocation of any wiring.

- The fuel cap and tank and the associated hardware must be removed in accordance with work health and safety procedures.
- These could include: observing correct jacking and support systems, location of fire protection close to the working area, correct personal protective equipment, correct use of exhaust extraction equipment and disposal of hazardous fluid according to state and federal regulations.
- This procedure needs to occur in a bunded area.
- Once clear of all components access to seams and spot welds may require the removal of paint.

Question 21 (b)

Criteria	Marks
<ul style="list-style-type: none"> Provides a comprehensive explanation of the precautions needed to protect the components adjacent to the repair Provides a comprehensive explanation of the reasons for the precautions Provides a logical and coherent response using industry-specific terminology 	7–8
<ul style="list-style-type: none"> Provides a substantial explanation of the precautions needed to protect the components adjacent to the repair Provides a substantial explanation of the reasons for the precautions Provides a logical response using industry-specific terminology 	5–6
<ul style="list-style-type: none"> Provides a sound explanation of the precautions needed to protect the components adjacent to the repair Provides a sound explanation of the reasons for the precautions Provides a logical response using industry terminology 	3–4
<ul style="list-style-type: none"> Provides a basic explanation of the precautions needed to protect the components adjacent to the repair Provides a basic explanation of the reasons for the precautions 	1–2

Answers could include:

When working with the removal and replacement of a rear quarter panel, the metal working power tools can easily damage the surrounding areas of the vehicle. Any damage is at the expense of the repairer and this decreases profit and efficiency when completing the repair. Many tools are used including:

- drills
- grinders
- air chisels
- plasma cutters
- welders.

Paint is very easily damaged as are wires, seats, windows, wheels and tyres. Areas adjacent need to be covered or removed. Windows remaining in the vehicle and paint are to be protected by welder's paper using masking tape to hold in place. Fire blankets can also be utilised to protect wheels and tyres.

Work health and safety procedures are to be used, personal protective equipment relevant to the power tools as well as all fire protection procedures. All work must be undertaken in a well-ventilated and bunded area.

Section IV

Question 22

Criteria	Marks
<ul style="list-style-type: none"> Provides a comprehensive explanation of how the automotive industry is addressing the disposal and recycling of automotive components and fluids Provides clear links to environmental sustainability Provides a systematic and reasoned approach Uses specific industry terminology 	13–15
<ul style="list-style-type: none"> Provides a detailed explanation of how the automotive industry is addressing the disposal and recycling of automotive components and fluids Provides links to environmental sustainability Provides a reasoned approach Uses specific industry terminology 	10–12
<ul style="list-style-type: none"> Provides a sound explanation of how the automotive industry is addressing the disposal and recycling of automotive components and fluids Provides some links to environmental sustainability Uses industry terminology 	7–9
<ul style="list-style-type: none"> Provides some explanation of how the automotive industry is addressing the disposal and recycling of automotive components and fluids Provides some environmental considerations Uses some industry terminology 	4–6
<ul style="list-style-type: none"> Provides general information on the disposal and recycling of automotive components 	1–3

Answers could include:

The automotive industry is facing unprecedented issues in becoming environmentally sustainable. Currently a large percentage of a vehicle is not recyclable. As recycling costs more than disposing in landfill, manufacturers are now becoming more environmentally responsible due to public and government pressure.

- Manufacturers are using less-damaging substances, for example, materials in clutches and brakes. They are using parts which are less disposable, such as cartridge oil and fuel filters. Car air conditioning units are also becoming more sustainable with the use of new gases and legislation for recycling greenhouse-producing gas.
- Batteries are now mostly recyclable. Some hybrid batteries can be repaired or are fully recyclable and are supported by dealership programs to be re-used.
- In Europe some countries have mandated that 70% of a vehicle must be fully recycled and a goal of 100% to be soon achieved.
- Car manufacturers are also using communication platforms within the vehicle to reduce the quantity of wiring. This is due to CAN bus communication. Copper wire can be re-used and recycled.
- The use of aluminium is increasing which decreases the vehicle's weight, thereby reducing emissions. It is also desirable to recycle aluminium as the energy needed to create it is much greater than recycling.

- Local repair workshops use waste disposal methods that include oil separators, package and parts recycling.
- Also environmental control, including noise, bunding and hazardous waste control.
- The use of recycled components reduces the manufacturing of new parts.
- Repair of existing components while more time-consuming is better for the environment. Plastic components can be recycled into other components but not necessarily used in the automotive industry. The use of water-based paints lessens the use of mineral thinners that are dangerous to the environment. Water-based paints have less impact on the environment and the operator's health. Recycling of all thinners and paints is now being encouraged within the industry. Contaminated waste and greywater is now recycled. Parts packaging is now being recycled. Ventilation filters are now installed in body repair shops to reduce surrounding pollution.
- Extended oil change intervals have reduced the amount of servicing required. Used engine oil makes up the bulk of waste from automotive workshops. Used engine oil can be filtered and re-used in industry as fuel oil for heaters and furnaces.
- Electric steering systems have replaced hydraulic steering systems in vehicles, thereby eliminating the need to flush or service the oil in hydraulic steering systems.
- Smaller capacity and higher efficiency cooling systems as well as long life coolants are being used. This reduces the number of coolant changes a vehicle requires during servicing.
- Fill-for-life transmissions have reduced the need to service the transmission.
- Future cars will be electric and by nature will be more environmentally sustainable due to fewer fluid and maintenance requirements. Electric motors are also fully recyclable.

2018 HSC Automotive Vehicle Body Mapping Grid

Section I

Question	Marks	HSC content – focus area
1	1	(Mandatory) Safety — risk assessment – p29
2	1	(Mandatory) Working in the automotive industry and workplace — working with others – p43
3	1	(Mandatory) Sustainability — environmentally sustainable work practices – p34
4	1	(Stream) Vehicle body — operation of automotive tools and equipment – p59
5	1	(Stream) Vehicle body — dismantling and removing components – p61
6	1	(Stream) Vehicle body — refinishing primed surfaces – p63
7	1	(Mandatory) Safety — safe work procedures and practices – p29–30
8	1	(Stream) Vehicle body — electrical fundamentals – p57–58
9	1	(Stream) Vehicle body — dismantling and removing components – p61
10	1	(Mandatory) Working in the automotive industry and workplace — working in the industry – p40
11	1	(Stream) Vehicle body — surface preparation for paint repairs – p62
12	1	(Stream) Vehicle body — electrical fundamentals – p57–58
13	1	(Stream) Vehicle body — surface preparation for paint repairs – p62
14	1	(Stream) Vehicle body — refinishing primed surfaces – p63
15	1	(Stream) Vehicle body — work tasks – pre-repair vehicle body operations and paint repairs preparation – p60

Section II

Question	Marks	HSC content – focus area
16 (a)	3	(Stream) Vehicle body — work tasks – pre-repair vehicle body operations and paint repairs preparation – p60–61
16 (b)	4	(Stream) Vehicle body — work tasks – pre-repair vehicle body operations and paint repairs preparation – p60–61
17 (a)	3	(Stream) Vehicle body — dismantling and removing components – p61
17 (b)	4	(Stream) Vehicle body — dismantling and removing components – p61
18 (a)	2	(Stream) Vehicle body — operation of automotive tools and equipment – p59
18 (b)	4	(Stream) Vehicle body — operation of automotive tools and equipment – p59
19 (a)	1	(Mandatory) Safety — risk management – p29
19 (b)	3	(Mandatory) Troubleshooting and problem-solving — troubleshooting processes – p36
19 (c)	4	(Mandatory) Troubleshooting and problem-solving — troubleshooting processes – p36
Question	Marks	HSC content – focus area
20 (a)	3	(Mandatory) Troubleshooting and problem-solving — troubleshooting processes – p36
20 (b)	4	(Mandatory) Troubleshooting and problem-solving — troubleshooting processes – p36

Section III

Question	Marks	HSC content – focus area
21 (a)	7	(Stream) Vehicle body — work tasks – pre-repair vehicle body operations and paint repairs preparation – p60 (Stream) Vehicle body — dismantling and removing components – p61
21 (b)	8	(Stream) Vehicle body — work tasks – pre-repair vehicle body operations and paint repairs preparation – p60 (Stream) Vehicle body — dismantling and removing components – p61

Section IV

Question	Marks	HSC content – focus area
22	15	(Mandatory) Safety — safe work procedures and practices – p29 (Mandatory) Sustainability — environmentally sustainable work practices – p34