

2014 HSC Automotive Marking Guidelines

Section I

Multiple-choice Answer Key

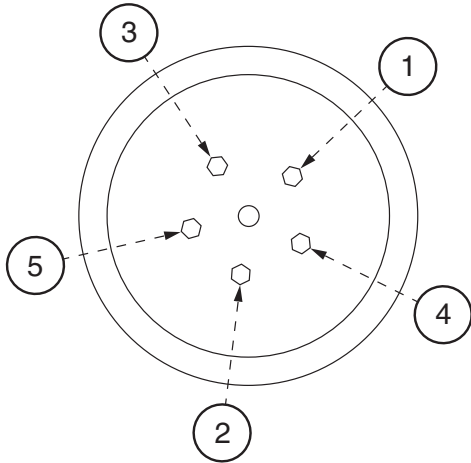
Question	Answer
1	C
2	D
3	B
4	C
5	B
6	A
7	D
8	A
9	C
10	D
11	C
12	C
13	B
14	B
15	D

Section II

Question 16 (a)

Criteria	Marks
<ul style="list-style-type: none"> Indicates the correct sequence for tightening wheel nuts 	1

Sample answer:



Every second nut should be tightened in sequence. This should represent a crisscross pattern.

Question 16 (b)

Criteria	Marks
<ul style="list-style-type: none"> Correctly identifies an appropriate tool Justifies the use of the chosen tool 	2
<ul style="list-style-type: none"> Identifies an appropriate tool 	1

Sample answer:

A tension wrench should be used so as not to over tighten or under tighten the wheel nuts. This prevents damage to wheel studs, hubs brakes and wheels as well as ensuring the nuts don't work loose.

Question 16 (c)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a comprehensive understanding of jacking procedures • Incorporates a broad range of safety precautions • Uses precise industry-specific terminology 	4
<ul style="list-style-type: none"> • Demonstrates a sound understanding of jacking procedures • Incorporates a range of safety precautions • Uses industry-specific terminology 	3
<ul style="list-style-type: none"> • Demonstrates an understanding of jacking procedures • May use industry-specific terminology 	2
<ul style="list-style-type: none"> • Demonstrates a limited understanding of jacking procedures 	1

Sample answer:

Choose a level floor to work on. Place suitable chock behind wheels, apply hand brake, check correct jacking point in vehicle specifications. Raise vehicle to desired height, place axle stands under suitable positions, and carefully lower jack onto stands, taking note of where the car is resting on the stands. Test for stability before working under vehicle.

Question 17 (a)

Criteria	Marks
<ul style="list-style-type: none"> • Identifies an appropriate component and justifies why it may be the cause of the condition 	2
<ul style="list-style-type: none"> • Identifies a component fault that may cause the condition 	1

Answers could include:

Battery low on charge, which may not be holding solenoid in place. Insufficient charge to turn starter motor armature. Dirty battery terminals causing high resistance. Faulty starter solenoid pulling in and out. Broken earth strap from engine to body. Voltage drop in the starter circuit. Battery low on charge caused by charging system not effectively charging the battery.

Question 17 (b)

Criteria	Marks
<ul style="list-style-type: none"> • Outlines an appropriate, well-ordered procedure to diagnose the condition and isolate the fault • Identifies the list of tools and equipment required • Uses precise industry-specific terminology 	4
<ul style="list-style-type: none"> • Outlines an appropriate procedure to diagnose the condition and isolate the fault • Identifies some tools and equipment • Uses industry-specific terminology 	3
<ul style="list-style-type: none"> • Outlines a procedure to diagnose the condition or isolate the fault • Identifies limited tools and equipment 	2
<ul style="list-style-type: none"> • Outlines a basic test procedure 	1

Sample answer:

Turn headlights on and check for change in brightness when attempting to crank engine. Check battery voltage using a voltmeter when attempting to crank motor. Check for voltage drop in live (+) side or circuit using a voltmeter. Check for voltage drop in earth side (-) or starter circuit. Use a hydrometer to check the state of charge of the battery. Check charging system performance (charging voltage).

Question 18 (a)

Criteria	Marks
<ul style="list-style-type: none"> • Outlines an appropriate and logical procedure for handling the complaint • Incorporates a range of communication strategies 	3
<ul style="list-style-type: none"> • Outlines an appropriate procedure for handling the complaint • Incorporates some communication strategies 	2
<ul style="list-style-type: none"> • Outlines a basic procedure for handling the complaint 	1

Sample answer:

Contact neighbour and arrange a meeting to discuss the problem. Keep detailed notes of conversation, as well as actions agreed to be taken. Clarify the main causes of problem for the neighbour, and ask for input from neighbour as to the proposed solution. Demonstrate active listening when the neighbour is speaking and try to use non-threatening body language and tone.

Question 18 (b)

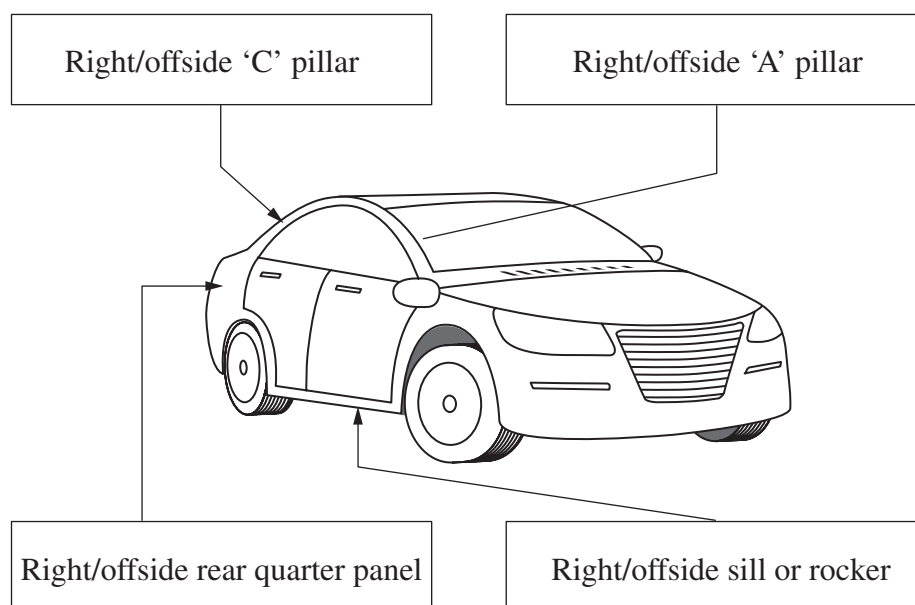
Criteria	Marks
<ul style="list-style-type: none"> Identifies a range of sources of workshop noise Proposes appropriate strategies that would be effective in reducing the impact of noise on the neighbour Uses industry specific examples 	3
<ul style="list-style-type: none"> Identifies sources of workshop noise Proposes strategies that would be effective in reducing the impact of noise on the neighbour 	2
<ul style="list-style-type: none"> Identifies a source of workshop noise Proposes a basic strategy for reducing impact of noise on the neighbour 	1

Sample answer:

Schedule noisy jobs to a time with less impact on neighbours. Soundproof compressors or other noisy equipment. Keep radio noise and unnecessary workshop noise down. Close windows or doors that may face the neighbour. Ensure operating hours are strictly adhered to.

Question 19 (a)

Criteria	Marks
Correctly identifies all components using industry-specific terminology	3
Correctly identifies TWO or more components using appropriate terminology	2
Correctly identifies ONE or more components using basic terminology	1

Sample answer:

Question 19 (b)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a clear understanding of how body component design relates to improved fuel efficiency and safety • Provides a range of examples • Uses industry-specific terminology 	3
<ul style="list-style-type: none"> • Demonstrates an understanding of how body component design relates to improved fuel efficiency and safety • Provides some suitable examples 	2
<ul style="list-style-type: none"> • Demonstrates a limited understanding of how body component design relates to improved fuel efficiency and safety 	1

Answers could include:

Body component design includes parts being made from high strength steel – lighter and improved aerodynamics. Improved accident strength. Inclusion of crumple zones. Fuel economy improvement due to reduction in weight as well as improved aerodynamics.

Examples:

Sill – lighter, saves fuel, stronger with less intrusion into cabin in the event of side impact. Front/rear quarter panel – inclusion of crumple zones, lighter, improved aerodynamics, reduced drag.

Question 20

Criteria	Marks
<ul style="list-style-type: none"> • Provides a detailed justification of the components and equipment needed for the installation of 100 watt driving lamps • Uses precise industry-specific terminology 	4
<ul style="list-style-type: none"> • Provides a sound justification of the components and equipment needed for the installation of 100 watt driving lamps • Uses industry-specific terminology 	3
<ul style="list-style-type: none"> • Provides a justification for some of the components and equipment needed for the installation of 100 watt driving lamps 	2
<ul style="list-style-type: none"> • Provides a basic justification for a limited number of components and equipment needed for the installation of 100 watt driving lamps 	1

Answers could include:

A relay is necessary to relieve additional current/ load on the original head lamps circuit. An on/off switch is necessary to isolate the driving lamps from the high beam. A minimum of 4 mm wire should be used in the supply to the driving lamps. Current protection must be used – a minimum of 20 amps through either a circuit breaker or a fuse. Terminals can either be soldered or crimped. A test lamp or voltmeter or use of a wiring diagram is required for correct wire/circuit identification. Could also include methods of physically mounting the lights. Equipment requirements could include soldering iron, crimp tools, mounting fasteners, drill and drill bit, head shrink, insulation tape etc.

Question 21 (a)

Criteria	Marks
<ul style="list-style-type: none"> Provides an accurate definition of a hybrid vehicle 	1

Sample answer:

A vehicle that has two methods of delivering power, such as battery-electric motor combined with a combustion engine.

Question 21 (b)

Criteria	Marks
<ul style="list-style-type: none"> Provides a detailed explanation of how energy is captured and stored in a hybrid system Uses industry-specific terminology 	5
<ul style="list-style-type: none"> Provides an explanation of how energy is captured and stored in a hybrid system Uses industry terminology 	3–4
<ul style="list-style-type: none"> Provides a limited explanation of how energy is captured and stored in a hybrid system 	1–2

Sample answer:

Regenerative braking technology is an example. Capacitor or battery energy can be captured by electric motors acting as generators to charge a battery or capacitor on deceleration or braking. This is achieved by a computer management system that allows this stored energy to be released back into the electric motor/generator that assists in providing power back to the wheels.

Section III

Question 22

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates an extensive understanding of the issues affecting the Australian automotive manufacturing industry • Provides a comprehensive description of how these issues may affect other related industries • Provides a detailed and cohesive response • Uses precise industry-specific terminology 	13–15
<ul style="list-style-type: none"> • Demonstrates a thorough understanding of the issues affecting the Australian automotive manufacturing industry • Provides a sound description of how these issues may affect other related industries • Provides a detailed response • Uses sound industry-specific terminology 	10–12
<ul style="list-style-type: none"> • Demonstrates an understanding of the issues affecting the Australian automotive manufacturing industry • Provides a description of how these issues may affect other related industries • Provides a descriptive response • Uses industry terminology 	7–9
<ul style="list-style-type: none"> • Demonstrates a basic understanding of the issues affecting the Australian automotive manufacturing industry • Provides a basic description of how these issues may affect other related industries • Uses some industry terminology 	4–6
<ul style="list-style-type: none"> • Demonstrates a limited understanding of the issues affecting the Australian automotive manufacturing industry • Uses general terms 	1–3

Question 22 (Continued)*Answers could include:*

<i>Negative Issues</i>	<i>Negative Effects</i>
Manufacturing base reduction	Workforce less capable of producing a wide variety of items
Workforce education	Cost of retraining for affected employees
Loss of skills	Skills lost that are too expensive to retrain for once this industry ceases to exist
Loss of manufacturing of aftermarket parts due to scales of production necessary for efficient production	Knock-on effect to other associated industries compounding unemployment
Payment of welfare to affected workers	Cost to government therefore taxpayers
Mental health	Cost to the health-system in regards to an individual's self-worth if unemployed and unskilled in the new workforce
<i>Positive issues</i>	<i>Positive effects</i>
Tourism	As foreshore areas have less-polluting industries tourism and recreational activities become available
Work skills	As the workforce is retrained new skills will be developed and offered
Cost of imports	As tariffs are removed this should result in lower costs for imported items
New industries	As vehicles such as hybrids are developed high tech industries and trades will be developed to support these
Positive use of previously unhealthy industries in foreshore areas	Better access to foreshore for all

Section IV**Question 23 (a)**

Criteria	Marks
<ul style="list-style-type: none">• Provides a detailed response indicating a range of reasons why diesel engines are increasing in popularity• Includes relevant examples• Uses precise industry-specific examples	3
<ul style="list-style-type: none">• Provides a sound response indicating some reasons why diesel engines are increasing in popularity• Provides some examples• Uses industry terminology	2
<ul style="list-style-type: none">• Makes some reference to why diesel engines are increasing in popularity• Uses basic industry terminology	1

Sample answer:

Diesel engines are now offered as an option in small to medium class vehicles. Fuel economy of diesel now outstrips petrol equivalent. Price of diesel option coming closer to cost of petrol. Torque of diesel occurs at low RPM. Noise reduction in current diesel engines. Exhaust emissions can now be less than petrol engines. Use of lightweight materials in engine design.

Question 23 (b)

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates a sound understanding of the differences between a diesel engine and a petrol engine• Provides a technical response, supported by appropriate examples• Uses precise industry-specific terminology	4
<ul style="list-style-type: none">• Demonstrates an understanding of the differences between a diesel engine and a petrol engine• Uses appropriate examples• Uses industry terminology	2–3
<ul style="list-style-type: none">• Demonstrates a limited understanding of the differences between a diesel engine and a petrol engine• Uses basic industry terminology	1

Sample answer:

Diesel engines have a higher compression ratio than petrol engines. Diesel engines use heat of compression to ignite fuel as opposed to spark ignition in petrol engines. Diesel engines are excess air engines that allows for complete burning of fuel. Diesel engines continue to inject fuel during the power stroke that increases torque. Diesel engines are noisier than petrol engines. Diesel engines are heavier than petrol engines. Diesel engines can have obvious exhaust smoke.

Question 23 (c)

Criteria	Marks
<ul style="list-style-type: none"> • Provides a detailed description of a broad range of technologies being applied to diesel operating systems • Demonstrates a sound technical understanding of the technologies used • Provides a logical and cohesive response • Uses precise industry-specific terminology 	8
<ul style="list-style-type: none"> • Provides a description of a range of technologies being applied to diesel operating systems • Demonstrates some technical understanding of the technologies used • Provides a logical response • Uses appropriate industry-specific terminology 	6–7
<ul style="list-style-type: none"> • Provides a description of some of the technologies being applied to diesel operating systems • Demonstrates a basic understanding of the technologies used • Uses industry terminology 	4–5
<ul style="list-style-type: none"> • Provides a basic description of technologies being applied to diesel operating systems • Uses general terms 	2–3
<ul style="list-style-type: none"> • Makes a relevant point 	1

Answers could include:

- Common rail injection system.
- Very high injection pressures.
- Computer controlled injection quantity/timing and multiple injections for each cycle. Piezo injectors for infinite fuel control. Computer controlled variable vane turbo charges with integrated heat exchangers.
- Exhaust treatment using add blue/exhaust recirculation/soot filters.
- Aluminium used for major components reduce engine mass.
- Multiple injection each cycle to reduce engine knock.

Automotive

2014 HSC Examination Mapping Grid

Section I

Question	Marks	Unit of competency / Element of competency	Employability skills (Please put an X where appropriate)							
			Communication	Teamwork	Problem-solving	Initiative and enterprise	Planning and organising	Self-management	Learning	Technology
1	1	AURC272003A Apply environmental regulations and best practice in a workshop or business p101			X					
2	1	AURE218708A Communicate effectively in the workplace p53						X		
3	1	AURC270103A Apply safe working procedures p34 Troubleshooting p27, 31, 32				X	X			
4	1	N/A Automotive industry induction p11, p12, p34 & WHS p34		X						
5	1	AURT270278A Use and maintain workplace tools and equipment p91								X
6	1	N/A Automotive systems and components p20								X
7	1	AURE218708A Carry out repairs to single electric circuits p74								X
8	1	AURC270789A Communicate effectively in the workplace p57	X							
9	1	AURT270278A Use and maintain workplace tools and equipment p87 AURC252103A Apply safe working practices p34				X				
10	1	AURT270278A Use and maintain workplace tools and equipment p94 & p87			X					
11	1	AURE218670A Service, maintain or replace batteries p68							X	
12	1	N/A Automotive industry induction p11, p12, p16					X			
13	1	N/A Automotive systems and components p20 AURC252103A Apply basic automotive troubleshooting processes p31								X
14	1	AURE218708A Carry out repairs to single electric circuits p78 & p79					X			
15	1	N/A Automotive systems and components p20							X	

Section II

Question	Marks	Unit of competency / Element of competency	Employability skills (Please put an X where appropriate)							
			Communication	Teamwork	Problem-solving	Initiative and enterprise	Planning and organising	Self-management	Learning	Technology
16 (a)	1	AURT270278A Use and apply workplace tools and equipment p91								X
16 (b)	2	AURT270278A Use and apply workplace tools and equipment p91			X					
16 (c)	4	AURT270278A Use and apply workplace tools and equipment p92				X				
17 (a)	2	AURC252103A Apply basic automotive troubleshooting processes p32 AURE218670A Service, maintain or replace batteries p64 & p68						X		
17 (b)	4	AURC252103A Apply basic automotive troubleshooting processes p32 AURE218670A Service, maintain or replace batteries p64 & p68					X			
18 (a)	3	AURC270789A Communicate effectively in the workplace	X							
18 (b)	3	AURC272003A Apply environmental regulations and best practice in a workplace or business p50, p56, p57, p98, p102, p104					X			
19 (a)	3	N/A Automotive systems and components p19 & p22								X
19 (b)	3	N/A Automotive systems and components p19 & p22 N/A Automotive industry induction p11 and p18								X
20	4	AURE218708A Carry out repairs to single electric circuits p80 & p83				X				
21 (a)	1	N/A Automotive systems and components p21								X
21 (b)	5	N/A Automotive systems and components p21 & p22								X

Section III

Question	Marks	Unit of competency / Element of competency	Employability skills (Please put an X where appropriate)							
			Communication	Teamwork	Problem-solving	Initiative and enterprise	Planning and organising	Self-management	Learning	Technology
22	15	N/A Automotive industry induction p14							X	

Section IV

Question	Marks	Unit of competency / Element of competency	Employability skills (Please put an X where appropriate)							
			Communication	Teamwork	Problem-solving	Initiative and enterprise	Planning and organising	Self-management	Learning	Technology
23 (a)	3	N/A Automotive systems and components p19, p20, p21								X
23 (b)	4									X
23 (c)	8									X