



2013 HSC Industrial Technology Automotive Technologies Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	B
2	C
3	C
4	A
5	A
6	A
7	B
8	D
9	D
10	C

Section II

Question 11

Criteria	Marks
• Provides TWO reasons for using lubricants	2
• Provides ONE reason for using lubricants	1

Answers could include:

- Reduce wear
- Reduce noise
- Reduce friction
- Prevent corrosion
- Resists oxidation
- Reduce heat/keep cool
- Remove fine particles

Question 12

Criteria	Marks
• Identifies the function and provides characteristics and features of how a thermostat operates in a cooling system	3
• Identifies the function and provides one characteristic or feature of how a thermostat operates in a cooling system	2
• Identifies the function OR • Identifies a location in a cooling system	1

Answers could include:

- The function of a thermostat is to close off the coolant outlet when the engine is cold.
- The thermostat controls the opening and closing of a valve in the coolant passage.
- The thermostat is a temperature-sensitive device, which controls the opening and closing of a valve in the coolant passage.
- Thermostats are designed to open at specific temperatures.
- A thermostat stops coolant from flowing when the engine is cold. It does this by restricting the flow of coolant until operating temperature is reached. The valve opens as it is temperature sensitive.

Question 13

Criteria	Marks
Clearly explains how a vehicle suspension system affects its handling and comfort	3
Identifies characteristic and features of how a vehicle suspension system affects its handling and comfort	2
Provides some relevant information	1

Answers could include:

The suspension systems keeps the vehicle stable and aligned. It also absorbs any shock and impact caused by an uneven road surface.

The suspension system is to reduce the transmission of the movement from the wheels to the body of the vehicle: the coil springs absorb the shock and allow the wheels to move up and down; the body stays aligned.

The suspension system is to dampen/cushion the impact caused by an uneven road surface. It absorbs shock and keeps the body/frame of the vehicle aligned.

Question 14

Criteria	Marks
Clearly explains how an engine management system improves fuel efficiency	3
Identifies characteristics of how an engine management system improves fuel efficiency	2
Provides some relevant information	1

Answers could include:

The engine management system improves fuel efficiency through an electronic control system. The electronic control system's main function in the fuel system is to dictate when the injectors open, and how long they remain open. This is particularly efficient as the electronic control system determines this by receiving inputs from a number of components.

Question 15

Criteria	Marks
• Demonstrates a clear understanding of a relationship between advances in materials and safety in vehicles • Uses examples as to why and how they improve safety	4
• Demonstrates some understanding of a relationship between materials and safety • Provides some examples	3
• Identifies advances in materials OR • Demonstrates a relationship between materials and safety	2
• Provides some relevant information	1

Answers could include:

Inertia-reel seat belts are most commonly fitted on vehicles with a retractor that takes up the slack after being fitted. This allows the belt to rest against the wearer but still gives some free movement.

Rip stitching of a seat belt is folded back and then stitched. In an accident, the stitching is designed to tear away under a predetermined load. This reduces the shock of forward movement.

Materials have improved safety by being lighter, stronger, corrosive resistant, more materials (eg glass to plastic) safety cage/shell/cell. Windscreens today are laminated, so they don't crack and shatter on impact.

Plastics are lighter, absorb impact far better than steel, to protect the driver/passenger. Less corrosive, no hidden defects.

Windscreens can also take much of the strength in the vehicle, body, and structure.

Section III

Question 16 (a)

Criteria	Marks
• Provides a detailed explanation of why it is important for a company to comply with safety standards	6
• Provides a sound explanation of why it is important for a company to comply with safety standards	4–5
• Provides a limited explanation of why it is important for a company to comply with safety standards	2–3
• Provides some relevant information	1

Sample answer:

It is important for a company to comply with safety standards for a number of reasons. Firstly, they are legally responsible for the safety of their employees and can be both financially and even criminally liable should the company be at fault for the injury or death of an employee. Another reason to comply with safety standards is to ensure that production is not disrupted. An industrial accident can cause a stop in production, which in turn will result in financial losses on top of the financial losses of paying workers' compensation for an injured worker. Injured employees may also have to be replaced and this will also add to the cost of workplace injuries, as it will be an extra wage to pay out. Morale and productivity could suffer as employees do not feel safe in the workplace and can even reach a point of production being stopped by employees until their right to a safe work environment is met.

Answers could include:

- Duty of care
- Government legislation
- Financial security
- Marketability of a product
- Goodwill of company
- Ethical issue

Question 16 (b)

Criteria	Marks
Provides a detailed assessment of strategies a company could implement to establish and maintain a safe work culture	9
Provides an assessment of strategies a company could implement to establish and maintain a safe work culture	7–8
Relates strategies a company could implement to establish and maintain a safe work culture	4–6
Attempts to provide strategies a company could implement to establish and maintain a safe work culture	2–3
Provides some relevant information	1

Sample answer:

A range of methods that could be implemented to establish and maintain a safe work culture are: establish a WHS committee, erect clear signage, and train employees.

Establishing a WHS committee ensures that all members of the workplace are represented and participate in risk assessments, site maintenance and site inspections. This method is very effective in ensuring communication of WHS requirements is clearly spread between all levels of the workforce. It provides the opportunity for different perspectives on workplace safety to be considered. A WHS committee also spreads responsibility for workplace safety across the entire company, which ensures everyone applies a consistent approach to safe work practices and management practices and fosters a positive and safe workplace culture.

Erecting clear signage that uses graphical information, over complex written policies, allows for both a reminder of safe work practices in hazardous areas and clear communication of safe work practices to workers with limited literacy. Signage is an excellent method to maintain a safe workplace culture as signs are easy to recognise and serve as constant reminders of safe work practices and hazards to people who may not have any training eg visitors to the workplace. Signage is particularly useful in the event of a new safety requirement or hazard. It is far quicker to erect a slippery floor sign over a spill than to send a memo out to all staff.

Training is another excellent method to ensure and maintain a safe workplace culture. It directly communicates safe work practices to employees and can ensure each employee is assessed as to how well they understand safety requirements or the correct procedure to work with hazardous materials, machinery or environments. It gives the employees a chance to clarify their understanding of the safe work practices as well as possibly develop their own skills in the use of machinery. When it is registered what an employee is trained to do, it is easier for management to ensure the employees are placed appropriately in a production line to ensure the employee's own safety and the safety of others.

Answers may include:

Assess a range of methods that could be implemented effectively to establish and maintain a safe work culture.

- Establish a WHS committee (Risk assessments / Site maintenance + inspection)
- Improve signage so that people who can't read can understand what is required
- Train employees re: WHS procedures eg evacuation
- Practice evacuation procedures once every 6 months
- Improve communication — meetings, posters, emails, message boards
- Train employees — in service and keep a register of trained personnel to identify training required
- Keep and maintain a register of incidents
- Monitoring
- Maintenance
- Supply PPE
- Site meeting
- Risk assessments

Industrial Technology Automotive Technologies

2013 HSC Examination Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	Tools and equipment	H2.1, H1.2
2	1	Engine and related components	H1.2, H4.3
3	1	Engine and related components	H1.2
4	1	Braking systems	H1.2, H7.2
5	1	Wheels and tyres	H6.2, H3.2
6	1	Braking systems	H3.2
7	1	Steering system	H1.2, H2.1
8	1	Fuel systems	H3.2
9	1	Body	H3.2, H4.3
10	1	Energy types, fuels and lubricants	H3.1, H3.2

Section II

Question	Marks	Content	Syllabus outcomes
11	2	Energy types, fuels and lubricants	H4.3
12	3	Cooling systems	H3.2, H4.3
13	3	Suspension system	H1.2, H4.3
14	3	Engine management systems	H3.2
15	4	Automotive design	H7.2

Section III

Question	Marks	Content	Syllabus outcomes
16 (a)	6	OHS (WHS)	H2.1, H6.1, H7.1, H7.2
16 (b)	9	OHS (WHS)	H2.1, H7.1, H7.2