



NZQA accredited and registered provider

## Cooling systems

# PRACTICE PAPER ONLY

**Test Paper One / Time allowed 90 mins**

To be completed by the student

**Student Name** \_\_\_\_\_ **Date** \_\_ / \_\_ /2020

**School/Provider** \_\_\_\_\_

To be completed by the School Invigilator/Coordinator/Tutor

**I confirm that this assessment was completed by the student named above as a closed book exercise under exam conditions**

**Invigilator Name** \_\_\_\_\_

**Invigilator Sign** \_\_\_\_\_

**Assessed By** \_\_\_\_\_

**Date** \_\_ / \_\_ / 2020

**Assessor's  
Stamp**

**Assessors Note: Materials relate to unit standard 30480**

# SAMPLE ASSESSMENT INSTRUCTIONS

## PLEASE MAKE SURE TO READ AND SIGN THIS SECTION

### ASSESSMENT INSTRUCTIONS

- Before starting this assessment you should have achieved a mark of at least 80% for your workbook.
- Use a black or blue ball point pen. (do not use pencil)
- Write your full name on the cover page.
- This is a closed book assessment, so you cannot bring any reference material in, or seek help from anyone else.
- You need to answer all the questions.
- Read the questions carefully, and give detailed answers when asked to.
- You must complete the assessment under exam conditions.
- To achieve the unit standard you must show competency for each outcome.

Complete the following by circling Yes or No as appropriate:

Are you ready to be assessed? **Yes** **No**

Have the assessment instructions these been explained to you? **Yes** **No**

Do you understand the assessment instructions? **Yes** **No**

Have you all the materials/resources that you need for this assessment? **Yes** **No**

Please sign to acknowledge that you have read these instructions and are ready to be assessed.

**Student Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**You must complete the assessment instructions on Page 2 before starting this assessment!**

**ELEMENT ONE**

Demonstrate knowledge of engine cooling system operation.

**1. Why must an internal combustion engine have a cooling system?**

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**2. Ok so we have to move the heat energy. This can occur in different ways. Match up the heat transfer term with its most appropriate description:**

Radiation

Convection

Conduction

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When heat energy moves along a solid object and into another solid object that is touching it.

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When heat energy is transferred by a moving liquid or gas.

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When heat energy is transferred even though there is no physical contact between the heat source and the heated object.

**3. Please circle T or F to indicate whether each of the following statements is true or false:**

T / F      When heat is removed it can cause an object to become smaller

T / F      When enough heat is added to water it will begin to boil and turn to vapour. This is called a “change of state”.

T / F      Heat will always move from a warmer region to a cooler region

T / F      Heat can change the colour of metals

**4. What are the key differences between a DIRECT cooling system and an INDIRECT cooling system?**

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**5. ON a DIRECT cooling system what is meant by the term “draught air flow”**

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**6. Identify three instances of poor practice in the following scenario:**

The foreman has asked David the apprentice to change the coolant in a vehicle that has just arrived in the workshop. David parks the vehicle over the storm water drain raises the bonnet and removes the drain plug at the bottom of the radiator allowing hot coolant to escape down the drain. He refits the plug and adds new coolant.

David pressure tests the cooling system and notices coolant leaking onto the workshop floor. He identifies a leaking hose where the clamp is not tight enough and tightens it. He pressure tests the system again and takes the car for a test drive with the radiator cap off.

When he returns he notices coolant splashes all over the engine bay and the engine is overheating. He quickly refits the radiator cap.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_

**7. Identify two types of cooling system fans from the list that are used on indirect cooling systems.**

**Tick the correct two boxes**

- Extractor fan
- Flex fan
- Thermostatic fan (variable speed fan)
- Electric fan

8. Please circle T or F to indicate whether each of the following statements is true or false:

T / F Both **direct and indirect** cooling systems can use a thermostat to control engine temperature.

T / F An **indirect** cooling system uses cooling fins

T / F An **Indirect** cooling system uses a water pump

T / F An **indirect** cooling system will use a fan or blower to remove heat from the engine

T / F A **direct** cooling system will have frost plugs.

T / F A **direct** cooling system will use shrouds or air ducting.

9. Draw a line to match up the cooling system with its appropriate descriptions.

Are more difficult to determine when the engine is overheating.

**DIRECT COOLING SYSTEMS**

Use liquid coolant.

**INDIRECT COOLING SYSTEMS**

Reach engine operating temperature quicker.

Use a radiator

10. Identify from the list each of the following indirect cooling system components and describe how it operates.

Water pump; Temperature sender unit; Coolant Reservoir; Frost plug; Temperature receiver unit; Thermostat



Component: \_\_\_\_\_

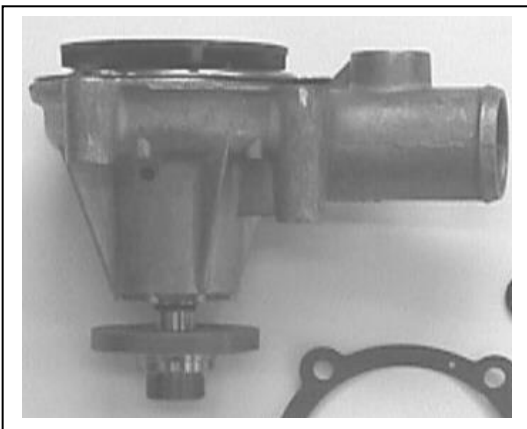
Operation

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Component: \_\_\_\_\_

Operation

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Component: \_\_\_\_\_

Operation

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Component: \_\_\_\_\_

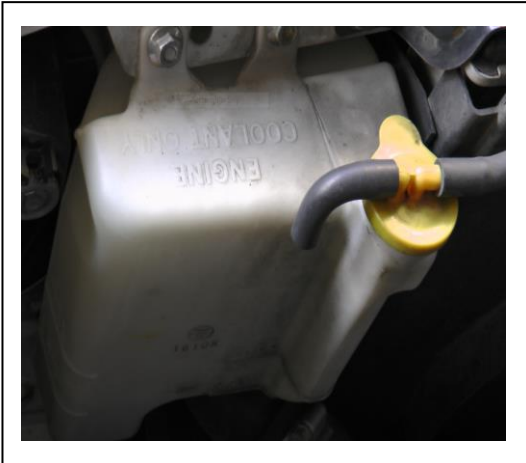
Operation

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Component: \_\_\_\_\_

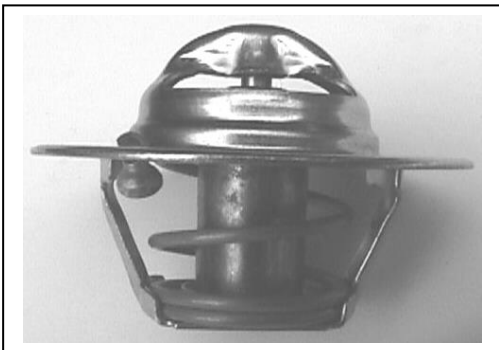
Operation

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Component: \_\_\_\_\_

Operation

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11. From the list below match up each cooling system component with its description: For example

**Radiator hose = Used to connect the engine and the water pump to the radiator**

Cooling fan; Anti-freeze; Water jackets; Radiator cap; Shrouds; Cooling fins; Drive belts; Radiator; Oil cooler;

<b>Radiator hose;</b>	Used to connect the engine and the water pump to the radiator
	Holds the coolant in the radiator under set pressure
	Draws air through the radiator to remove heat from the coolant
	Mixture of water and ethylene glycol
	Directs air to the hottest engine components
	Is driven by the crankshaft and drives the water pump and other accessories
	Allows hot coolant to be exposed to a cooler air flow
	Chambers that allow the coolant to circulate through the engine block and cylinder head
	Used to maintain operating temperature of automatic transmission
	Dissipate heat created in a direct air cooled engine

**ELEMENT TWO**

Demonstrate knowledge of disposing of coolant.

1. **What is the name of the law that deals with the proper methods of disposing of coolant?**

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2. **Describe how old coolant should be properly disposed of.**

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- 3 **What does testing the specific gravity of coolant tell you about the composition of the coolant?**

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4. “Antifreeze” usually has other properties apart from lowering the freezing point of the coolant.

Describe one of these other properties.

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**FINISHED? CHECK THAT YOU HAVE ATTEMPTED ALL QUESTIONS!**



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