



NZQA accredited and registered provider

Diesel 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 21677-30437

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 diesel oil as an automotive fuel.

1. **What is meant by the term “self-ignition temperature” when referring to diesel fuels?**

2. **What is meant by the term “viscosity” when referring to diesel fuels?**

3. **What is meant by the term “flash point” when referring to diesel fuels?**

4. Match up the diesel oil properties with their descriptions. For example:

A – Cloud Point = 3 – Temperature at which diesel starts to wax and become thicker

A	Cloud point	A3	1	Is the material that is left behind in the combustion chamber after burning
B	Sulphur content		2	Is a measure of the heat produced from the fuel during burning
C	Resistance to contamination		3	Temperature at which diesel starts to wax and become thicker
D	Energy content		4	Time between fuel injection and the start of combustion
E	Oxidation and water		5	Is a property of diesel that when combined with water produces an acid which corrodes engine components
F	Carbon residue		6	Measures how effective the diesel fuel is at limiting the growth of harmful bacteria in the fuel tank.
G	Ignition lag		7	This makes the diesel appear cloudy and is a major problem

5. Which grade of fuel (summer or winter) has a greater quantity of kerosene content?

Why is the kerosene added and what effect does this have on the fuel?

ELEMENT TWO

Demonstrate knowledge of a diesel fuel system.

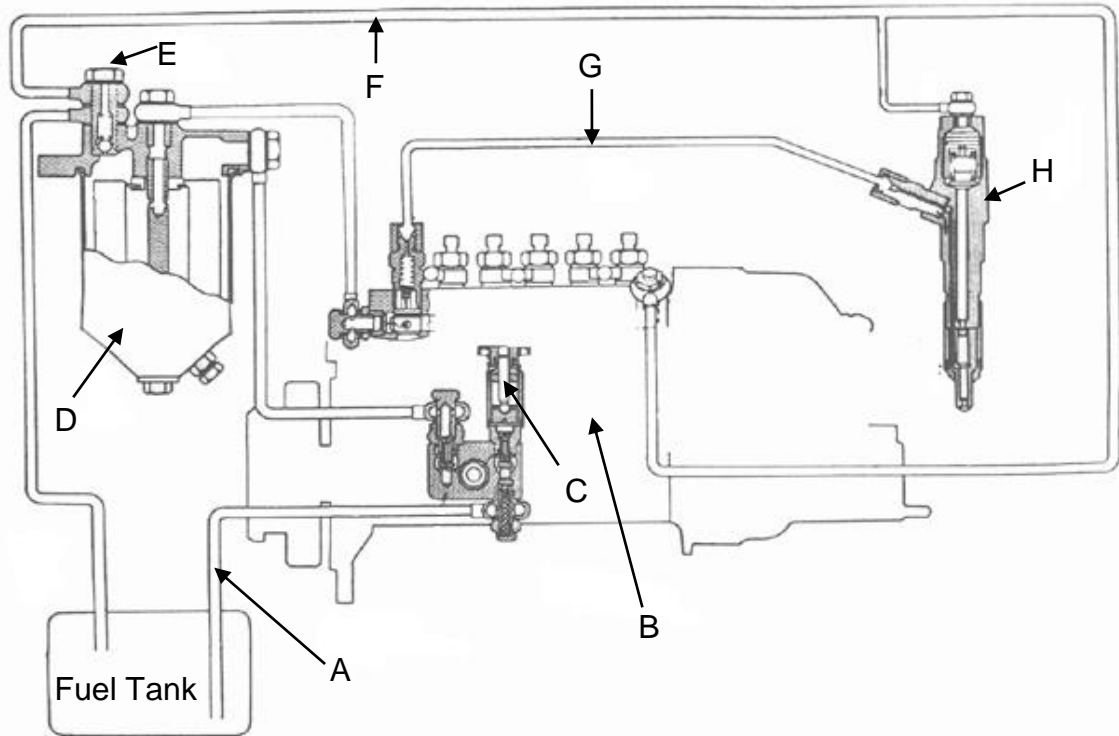
1. From the list provided identify the fuel injection components A-H shown in the following diagram.

Injector pump
 Fuel return pipe
 Manual primer/lift pump
 High pressure delivery pipe

Air bleeder screw
 Injector
 Fuel filter
 Low pressure fuel pick up pipe

A		E	
B		F	
C		G	
D		H	

- 1b. Draw a line with arrows to trace the fuel flow path



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2. Match up the diesel fuel system components with the most appropriate clue. For example:

A – Fuel tank = 4 – Designed to hold the diesel fuel safely

A	Fuel tank	A4	1	Located in the injector pump assembly and controls engine speed using spinning weights to control the fuel delivery plunger.
B	Air system		2	Has a longer life, is light weight with a smaller volume than traditional injector types
C	Hole type injector		3	Located in the injector pump assembly and is part of the throttle delay mechanism. Used to assist with delaying fuel supply to the injectors
D	Injector pump		4	Designed to hold the diesel fuel safely
E	Mechanical governor		5	Located in the injector pump assembly and advances injection timing at idle and during low speed running. This advance provides more time for fuel to burn which improves performance and prevents soot emissions during start up.
F	Pencil injector		6	Supplies clean air for the air intake system of the engine
G	Start aid mechanism		7	Used on direct injection engines
H	Yield link		8	Designed to meter the exact amount of fuel to each injector at precisely the right time.

3. Match up the diesel fuel system components with the most appropriate clue. For example:

A – Lift pump = 3 – Draws the fuel from the tank and supplies it to the injector pump.

A	Lift pump	A3	1	Must be able to withstand very high pressures particularly between the injector pump and the injectors
B	Fuel line		2	Located in the injector pump assembly and is used to delay full throttle when the engine is accelerated.
C	Glow plugs		3	Draws fuel from the tank and supplies it to the injector pump.
D	Hydraulic governor		4	Injector and pump are combined in one
E	Electronic governor		5	Injector used for pre-combustion chamber engines
F	Pintle nozzle injector		6	Located in the injector pump assembly and uses a magnetic speed sensor to monitor engine rpm and feeds information to the ECU
G	Throttle delay mechanism		7	Located in the injector pump assembly and uses oil pressure to control engine speed.
H	Unit injector		8	Designed to assist starting at low temperatures

4. **How many pumping elements are in an in-line four cylinder fuel injection pump?**

5. **How many pumping elements are in a rotary type four cylinder fuel injection pump?**

6. **Name two common types of diesel fuel filters used in the automotive industry.**

1

2

7. **Describe two safety precautions to be observed when working on vehicles equipped with electronically controlled diesel fuel injection systems.**

1

2

8. **Describe the two main functions of the injectors used in diesel fuel systems**

1

2

9. What are the main types of injectors and in which type of engines are they used?

10. Provide a brief description of the common rail diesel system and outline two advantages the system has over standard diesel engines

11. What is the main function of a governor?

12. What is the main function of a throttle delay mechanism?



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