

071606T4AUT

AUTOMOTIVE ENGINEERING LEVEL 6

ENG/OS/AUT/CR/03/6/A

Service Vehicle Fuel System

July/August 2024



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

WRITTEN ASSESSMENT

TIME: 3 HOURS

INSTRUCTIONS TO THE CANDIDATE

1. *This paper consists of **TWO** sections: **A** and **B**.*
2. *Attempt **ALL** the questions in Section **A** and any **THREE** questions from Section **B**.*
3. *Marks for each question are as indicated.*
4. *You are provided with a separate answer booklet.*
5. *Do not write on the question paper.*

This paper consists of FOUR (4) printed

**Candidates should check the question paper to ascertain that all
pages are printed as indicated and that no questions are missing.**

SECTION A: (40 MARKS)

Attempt ALL the questions in this section

Turn over

1. The main goal of safety and health programs is to prevent workplace injuries, illnesses, and deaths, as well as the suffering and financial hardship. State FOUR safety precautions to be observed when servicing the vehicle fuel system. (4 Marks)
2. The basic principle of fuel injection is that the right amount of fuel must be injected at the right time to satisfy engine horsepower demands. Mention the operational difference between the inline injection pump and distributor diesel injection pump. (4 Marks)
3. Common rail fuel injection systems have become popular because of the incorporation of the electronic control. Name FOUR key components of the common rail fuel injection system (4 Marks)
4. For efficient production of engine power, diesel fuel used in diesel engines must possess certain qualities. State FIVE functional requirements of diesel fuel (5 Marks)
5. Highlight FOUR types of fuel injector nozzles that may be fitted to CI engines (4 Marks)
6. Name FOUR precautions to be observed while handling pipes that carry fuel (4 Marks)
7. Explain how timing belt tensioner is adjusted during injector pump timing (4 Marks)
8. State four types of vehicle speed governors. (4Marks)
9. List FOUR tools that are used to remove and refit petrol fuel components (4 Marks)
10. One of the problems with CI injectors is that their efficiency deteriorates with time, making it necessary to have the injectors serviced at regular intervals. State THREE factors that affects the frequency of such maintenance. (3 Marks)

SECTION B: (60 MARKS)

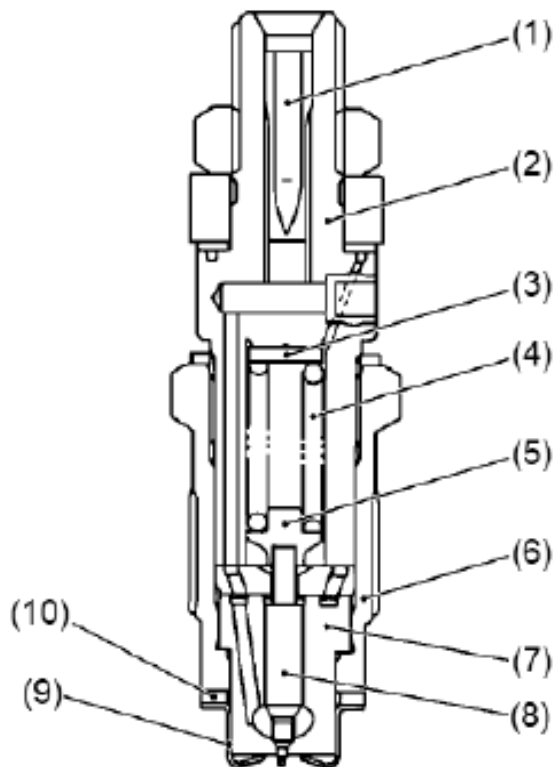
Attempt any THREE questions in this section

11.

- a) Electronic fuel injection has largely been utilized in our modern cars over the carburetor due to its various advantages. State FIVE advantages of electric petrol injection. (5 Marks)
- b) Highlight any SIX typical sensors for Electronic Fuel Injection System. (6 Marks)
- c) A vehicle is brought in the workshop with faulty injectors; you are tasked to undertake the following test on the fuel injectors. Explain how you will undertake each of the test.
 - i. Leak test (3 Marks)
 - ii. Nozzle opening pressure test (3 Marks)
 - iii. Chatter test (3 Marks)

12.

- a) The figure below represents the throttle type nozzle. Name the parts labelled 1-10 (10 Marks)



b) As a senior mechanic, a vehicle was brought in your workshop with following engine faults, highlight FIVE possible causes of each faults.

i) Engine fails to fire (5 Marks)

ii) Insufficient engine power (5 Marks)

13.

a) State TWO functions of a governor in diesel engines (4 Marks)

b) In servicing of vehicle fuel system, regular fuel filter changes are recommended as per manufacturer specifications. State any FOUR dangers of not replacing the fuel filter as per manufacturer's specification. (4 Marks)

c) There are several indications that can alert you of a fault in your fuel system. Highlight FOUR causes of each of the following faults in the fuel system.

i) Engine running rough (4 Marks)

ii) Engine emitting black smoke (4 Marks)

iii) Too high fuel consumption. (4 Marks)

14.

a) The function of the diesel fuel system is to inject a precise amount of atomized and pressurized fuel into each engine cylinder at the proper time. Name TWO types of fuel systems for diesel engines (2 Marks)

b) Briefly explain THREE types of fuel tanks used in automobile industry (6 Marks)

c) The fuel system feeds fuel from the fuel tank to the combustion chamber.

i) Sketch fuel system and label the tank, fuel filter, drain valve and the pump (8 Marks)

ii) State the functions of the parts labelled in (i) above. (4 Marks)