| **COMPETENCY BASED LEARNING MATERIAL** | |  |
| --- | --- | --- |
|  | |  |
|  | | | |
| *Sector:* AUTOMOTIVE/LAND TRANSPORT SECTOR | | | |
| *Distinctive Area of Competence and Qualifications:* **Automotive Servicing NC I** | | | |
| *Unit of Competency:* Perform Periodic Maintenance of Automotive Engine | | | |
| Module Title:  **Performing Periodic Maintenance of Automotive Engine** | | | |
| C:\Users\AIT\Desktop\logo.jpg | **AUTOHUB INSTITUTE OF TECHNOLOGY** | | |

# 

**NATIONAL CERTIFICATE LEVEL 1**

**QUALIFICATION LEVEL**

**COMPETENCY-BASED LEARNING MATERIALS**

| **No.** | **Basic Competencies** | **Module Title** | **Code** |
| --- | --- | --- | --- |
|  | Receive and Response to Workplace Communication | Receiving and Responding to Workplace Communication | 500311101 |
|  | Work with Others | Working with Others | 500311102 |
|  | Demonstrate Work Values | Demonstrating Work Values | 500311103 |
|  | Practice Housekeeping Procedures | Practicing Housekeeping Procedures | 500311104 |

| **No.** | **Common Competencies** | **Module Title** | **Code** |
| --- | --- | --- | --- |
|  | Validate Vehicle Specification | Applying Appropriate Sealant/Adhesive | ALT723201 |
|  | Move and Position Vehicle | Moving and Positioning Vehicle | ALT832212 |
|  | Utilize Automotive Tools | Performing Housekeeping | ALT723214 |
|  | Perform Mensuration and Calculation | Performing Mensuration and Calculation | ALT723215 |
|  | Utilize Workshop Facilities And Equipment | Performing Safety Practices | ALT723216 |
|  | Prepare Servicing Parts and Consumables | Reading, Interpreting and Applying Specifications and Manuals | ALT723217 |
|  | Prepare Vehicle For Servicing and Releasing | Using and applying Lubricant/Coolant | ALT723218 |

| **No.** | **Core Competencies** | **Module Title** | **Code** |
| --- | --- | --- | --- |
|  | Perform Pre-Delivery Inspection | Performing Pre-Delivery Inspection | ALT723372 |
|  | Perform Periodic Maintenance of Engine | Performing Periodic Maintenance of Engine | ALT723373 |
|  | Perform Periodic Maintenance of Drive Train | Performing Periodic Maintenance of Drive Train | ALT723374 |
|  | Perform Periodic Maintenance of Brake System | Performing Periodic Maintenance of Brake System | ALT723375 |
|  | **Perform Periodic Maintenance of Suspension System** | **Performing Periodic Maintenance of Suspension System** | **ALT723376** |
|  | Perform Periodic Maintenance of Steering System | Performing Periodic Maintenance of Steering System | ALT723377 |

**HOW TO USE THIS COMPETENCY BASED LEARNING MODULE**

Welcome to the Module: **Performing Periodic Maintenance of Automotive Engine**. This module contains training materials and activities for you to complete.

The unit of competency ***Perform Periodic Maintenance of Automotive Engine*** contains the knowledge, skills and attitudes required for ***Automotive Servicing NC I*** . It is one of the Core Modules at ***National Certificate Level I (NC I )***.

You are required to go through a series of learning activities in order to complete each learning outcome of the module. In each learning outcome there are Information Sheets, Resource Sheets and Reference Materials for further reading to help you better understand the required activities. Follow these activities on your own and answer the self-check at the end of each learning outcome. Get the answer key from your instructor and check your work honestly. If you have questions, please don’t hesitate to ask your facilitator for assistance.

**Recognition of Prior Learning (RPL)**

You may already have some or most of the knowledge and skills covered in this module because you have:

* been working for someone
* already completed training in this area

If you can demonstrate to your trainer that you are competent in a particular skill or skills, talk to him/her about having them formally recognized so you won’t have to do the same training again. If you have qualifications or Certificates of Competency from previous trainings, show them to your trainer. If the skills you acquired are still relevant to this module, they may become part of the evidence you can present for RPL.

At the end of this learning material is a Learner’s Diary, use this diary to record important dates, jobs undertaken and other workplace events that will assist you in providing further details to your trainer or assessors. A Record of Achievement is also provided for your trainer to complete once you completed the module.

This learning material was prepared to help you achieve the required competency, in : ***Performing Periodic Maintenance of Automotive Engine NC I***. This will be source of information for you to acquire the knowledge and skills in this particular trade independently and your own pace with minimum supervision or help from your instructor.

In doing the activities to complete the requirements of this module, please be guided by the following:

* Talk to your trainer and agree on how you will both organize the training under this module. Read through the module carefully. It is divided into sections that cover all the skills and knowledge you need to successfully complete.
* Work through all information and complete the activities in each section. Read the information sheets and complete the self-checks provided in this module.
* Most probably your trainer will also be your supervisor or manager. He/She is there to support you and show you the correct way to do things. Ask for help.
* Your trainer will tell you about the important things you need to consider when you are completing the activities and it is important that you listen and take notes.
* You will be given plenty of opportunities to ask questions and practice on the job. Make sure you practice your new skills during regular work shifts. This way you will improve both your speed and memory and also your confidence.
* Talk to more experienced work mates and ask for their guidance.
* Use self-check questions at the end of each section to test your own progress.
* When you are ready, ask your trainer to watch you perform the activities outlined in this module.
* As you work through the activities, ask for written feedback on your progress. Your trainer keeps feedback/pre-assessment reports for this reason. When you have completed this learning material and feel confident that you have had sufficient knowledge and skills, your trainer will arrange an appointment with a registered assessor to assess you. The results of the assessment will be recorded in your Competency Achievement Record.

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QUALIFICATION : Automotive Servicing NC I

UNIT OF COMPETENCY : Perform Periodic Maintenance of Automotive

Engine

MODULE TITLE : Performing Periodic Maintenance of Automotive

Engine

PERFORMANCE CRITERIA:

1. **LO 1: Prepare for Inspection and Service Engine**
   1. Job requirements are determine from workplace instruction
   2. Servicing information is sourced and interpreted
   3. Hazards associated with the work are identified and risk are manage.
   4. Tools, equipment and materials are selected and checked for serviceability.
2. **LO 2: Inspect Engine**

2.1 Inspection is carried out according to manufacturer specification , workplace

procedures and safety.

2.2 Inspection result are compared with manufacturer specification.

2.3 Inspection findings are reported according to workplace procedures, including

recommendations for necessary repairs or adjustment.

2.4 PPEs are worn following OSHS.

1. **LO 3: Service Engine**

3.1 Service and adjustment are carried out according to manufacture

Specification, workplace procedure and safety and environmental requirements

and without causing damage to components or system

3.2 Irregularities are recorded using inspection sheet according to workplace

procedures.

3.3 Post-service testing is carried out according workplace procedures.

3.4 PPEs are worn.

3.5 Safety Practices are applied

1. **LO 4: Complete work processes**
   1. Initial quality inspection is performed based on workplace procedures.
   2. Vehicle is turned over to immediate supervisor for final inspection to ensure work done according to workplace standards expectations.
   3. Work area is restored following standard operating procedures.
   4. Waste management is practice according to 5s of good house keeping
   5. Tools and equipment are checked and stored according to work place procedures
   6. Workplace documentation is prepared according to workplace procedures

.

**RESOURCES:**

Jack Erjavec & Robert scharff, **Automotive Technology, A system Approach**, 2nd Ed.

Crouse, W.H. and Anglin, D.L., **Automotive Mechanics,** 10th Ed.,

Santos, G.N. and Lebron G.B., **Chemistry.**

Don Kowels, **Basic Automotive Service and Maintenance.**

QUALIFICATION : Automotive Servicing NC I

UNIT OF COMPETENCY : Perform Periodic Maintenance of

Automotive Engine

MODULE TITLE : **Performing Periodic Maintenance of**

**Automotive Engine**

**LEARNING OUTCOME 1 : Prepare for Inspection and Service**

**Engine**

PERFORMANCE CRITERIA

**LO 1: Prepare for Inspection and Service Engine**

* 1. Job requirements are determine from workplace instruction
  2. Servicing information is sourced and interpreted

1.3 Hazards associated with the work are identified and risk are manage.

1.4Tools, equipment and materials are selected and checked for serviceability

RESOURCES:

1. Jack Erjavec and Robert scharff, **Automotive Technology, A system Approach**, 2nd Ed.
2. Crouse, W.H. and Anglin, D.L., **Automotive Mechanics,** 10th Ed.,
3. Santos, G.N. and Lebron G.B., **Chemistry.**
4. Don Kowels, **Basic Automotive Service and Maintenance.**

**INFORMATION SHEET : 1**

UNIT OF COMPETENCY : Perform Periodic Maintenance of

Automotive Engine

MODULE TITLE : Performing Periodic Maintenance of

Automotive Engine

**LEARNING OUTCOME 1 : Prepare for Inspection and Service**

**Engine**

**OSHS**

The **Occupational Safety and Health Standards** was formulated in 1978 in compliance with the constitutional mandate to safeguard the worker’s social and economic well-being as well as his physical safety and health. Adopted through the tested democratic machinery of tripartism, the 1978 Standards is considered as a landmark in Philippine labor and social legislation.

With joint efforts from the Bureau of Working Conditions, the International Labour Organization (ILO) Manila Office and the tripartite sectors, the revisions to the OSH Standards were approved in August 1989. With the latest improvements in the Standards, all establishments covered will now be provided with a better tool for promoting and maintaining a safe and conducive working environment.

**Personal Protective Equipment (PPE)**

Places of work must establish and administer an effective PPE (Personal Protection Equipment) program for all employees, visitors and volunteers. All of these people need to use PPE and be trained in the proper use of PPE. Workplaces are required to conduct an assessment to determine the various physical hazards that may be present.



**Hazzard Control**

All workplace hazards can be controlled to a certain degree using a variety of methods. The goal of controlling hazards is to prevent workers from being exposed to occupational hazards. Some methods of hazard control are more efficient than others, but a combination of methods usually provides a safer workplace than relying on only one method.

There are five general categories of control measures:

1. elimination (removal or exclusion)
2. substitution (replacement or exchange)
3. engineering controls (isolation or enclosure)
4. administrative controls (organisation or management)
5. personal protective equipment (least effective)

**The following control measures should included as part of the Safe Operating Procedures at your workplace**.

**Maintenance of PPE**

In addition to providing you with PPE, your employer must maintain the PPE used by everyone. If a piece of PPE cannot be repaired, it must be discarded and replaced NOTE: If you have your own personal protective equipment, it must be approved by your supervisor before you can use it on the job. The wearing of PPE is the last step in the management and control of identified risks. Just because you are wearing PPE, does not mean that the risk of injury has been removed.

**Follow All Warnings and Precautions Take time to read any and all warnings, signs, safe work procedures and other precautions that may appear on tools, equipment, chemicals, Material Safety Data Sheet (MSDS), and personal protective equipment (PPE).** 

**Protection Potential Hazards**

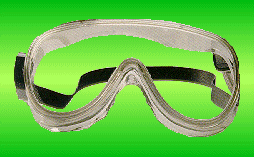
**Eye Protection**



Small particles of matter can enter your eyes and damage them. Operations such as grinding, chiselling, sanding, hammering, and spraying can create small airborne particles; particles that can injure your eyes. Toxic chemicals in the form of gases, vapours, and liquids can damage your eyes. Always read the appropriate MSDS before working with any hazardous material. Operations such as grinding, chiselling, sanding, and hammering often create flying objects or particles that can damage your eyes.



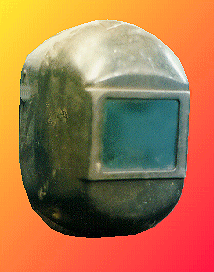
**Safety glasses** are perhaps the most widely used type of eye protection. While they may look similar to regular glasses, they are much stronger and more resistant to impact and heat than regular glasses. In addition, most safety glasses are equipped with side shields that give you protection from hazards that may not be directly in front of you.



**Goggles** give you more protection than safety glasses because they fit closer to your face. Because goggles surround the eye area, they give you more protection in situations where you might encounter splashing liquids, fumes, vapors, powders, dusts, and mists.



**Face shields** offer you full face protection and are often used around operations which expose you to molten metal, chemical splashes, or flying particles. Many face shields can be used while wearing a hard hat. NOTE: When operating machinery where there is a risk of the workpiece fragmenting, you should always wear safety glasses when using a face shield for added protection.



**Welding helmets** provide both face and eye protection. Welding helmets use special absorptive lenses that filter the intense light and radiant energy that is produced during welding operations.

**Breathing Protection**



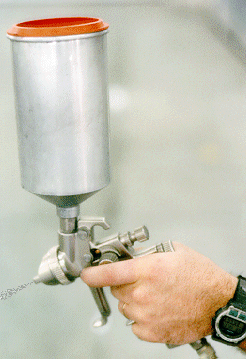
Hazardous materials only present a health hazard when they come into contact with your body. Hazardous materials can enter your body in three ways: Ingestion Skin Absorption Inhalation Inhalation is the most common route of exposure for most materials which are health hazards. This includes breathing in dust, fumes, oil mist, and vapours from solvents and various gases.



**Dusts** are formed whenever solid material is broken down into tiny articles.Dustsare often produced during sanding and grinding operations.



**Vapours** are substances that are created when a solid or liquid material evaporates. Materials that evaporate easily at room temperature include paint thinner, solvents, and gasoline.



**Mists and sprays** are very small droplets of liquid material suspended in the air. They are often produced by spray and coating operations.



**Fumes** can occur whenever a metal, plastic, or polymer is subjected to a high heat during such processes as welding and soldering operations. Gases Gases are materials that become airborne at room temperature. Gases may have an odour, but many do not. Some gases can be seen, but again, others cannot.

**Gases** may be heavier than air, or lighter than air, but in either case, can travel for great distances undetected.

**Smoke** is made up of small particles produced by the incomplete combustion of any material that has carbon in it. Smoke is often produced during processes that require high heat or burning as part of the manufacturing process.

**Types of Respirators and Masks Air Purifying Respirators**

**These types of respirators include:**

* Air Purifying Disposable Particulate Masks 
* Air Purifying Half Mask Respirators



* Air Purifying Full Face Mask Respirators



**They also include Gas Masks and Powered Air Purifying Respirators.**

**Supplied Air Respirators**

These types of respirators include:  
- Airline Respirators;  
- Emergency Escape Breathing Apparatus;  
- Self-Contained Breathing Apparatus (SCBA).



**Hearing Protection**



Noise is a common problem found in many workplaces. Research has shown that high levels of noise can damage your hearing. Losing your hearing is a gradual process, and is less noticeable than other types of workplace injuries. It is, however, a permanent handicap for those who are affected. You should wear a hearing protection device whenever you are exposed to noise that is 85 decibels or greater for an 8-hour period of time.

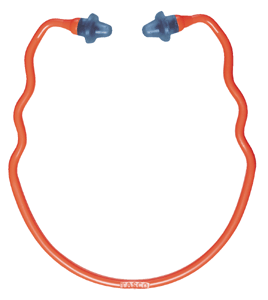
**Types of Hearing Protection Devices**

Many types of hearing protection devices are available.



**Foam Earplugs**

The advantages of Foam and PVC earplugs are: Small & lightweight Comfortable in hot environments Easily used with other safety equipment



**PVC Earplugs**

The disadvantages of earplugs are: May work loose and require occasional refitting Require specific fitting instructions Are frequently soiled



**Earmuffs**

The advantages of earmuffs are:

Easy for your teacher to supervise the wearing of this device. One size fits all Fits better for longer periods of time

The disadvantages of earmuffs are:

May fit tight on your head Uncomfortable in a warm environment

Problems occur when used with other equipment

**Foot Protection**



Impact Injuries Heavy objects can fall on your feet. If you work around sharp objects, you can step on something sharp and puncture your foot. Injuries from Spills and Splashes Liquids such as acids, caustics, and molten metals can spill into your shoes and boots. These hazardous materials can cause chemical and heat burns. Compression Injuries Heavy machinery, equipment, and other objects can roll over your feet. The result of these types of accidents is often broken or crushed bones. Electrical Shocks Accidents involving electricity can cause severe shocks and burns. Slipping Oil, water, soaps, wax, and other chemicals can cause you to slip and fall. Housekeeping Poorly maintained machinery, tools, sloppy work areas, and cluttered aisles can all contribute to foot injuries. Wearing Protective Footwear Substantial footwear appropriate to any practical activity should be worn. When carrying out practical activities especially when using chemicals or hazardous equipment you should wear enclosed footwear with firm uppers, such as leather. Footwear such as thongs, open weave type shoes, or shoes with openings at toes or heels, platforms or high-heel shoes should not be worn in areas which present hazardous situations. Where indicated by a risk assessment, the wearing of safety footwear is mandatory. Avoid footwear made of cloth especially if you work around acids or caustics. Make sure your footwear fits correctly. If you work in an area with wet floors, you should wear rubber soled footwear. Inspect your footwear before you use them. Look for holes and cracks. After working with chemicals, hose your footwear with water to rinse away any chemicals or dirt.

SELFCHECK : 1

UNIT OF COMPETENCY : PERFORM PERIODIC MAINTENANCE OF AUTOMOTIVE

ENGINE

MODULE TITLE : Performing Periodic Maintenance of Automotive Engine

**LEARNING OUTCOME 1 : Prepare for inspection and Service**

**Engine**

Answer the following questions

1. In regard to training for the use of PPE who must provide you training? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What type of PPE can be worn to protect your eyes? · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. In what three (3) ways can hazardous materials enter your body? · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. What is the most common route of exposure for most materials that are health hazzards.

5. What are the two major categories of respirators? Give examples. · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. List the three types of hearing protection available and state advantages of each. ·

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. What types of injuries can happen to your feet if not correctly protected? · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. List three (3) aspects required when wearing protective footwear. · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ · \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ANSWER SHEET : 1**

UNIT OF COMPETENCY : PERFORM DIESEL ENGINE TUNE UP

MODULE TITLE : Tuning Up Diesel Engine

**LEARNING OUTCOME 1 : Set Injection Timing**

1. A
2. C
3. C
4. B

QUALIFICATION : Automotive Servicing NC I

UNIT OF COMPETENCY : Perform Periodic Maintenance of

Automotive Engine

MODULE TITLE : Performing Periodic Maintenance of

Automotive Engine

**LEARNING OUTCOME 2 : Inspect Engine**

PERFORMANCE CRITERIA

**LO 2: Inspect Engine**

2.1 Walk around is conducted according to industry practice

2.2 Factory-loaded parts are inspected following manufacture’s standard

procedure.

2.3 Vehicle is restored following standard operating procedure

2.4 Vehicle is check following standard operating procedure

2.5 Minor corrective measure are applied following manufacturer’s manual

2.6 Inspection checklist is accomplished based on manufacture’s standard

2.7 PPEs are worn based on OSHS.

According to

**RESOURCES:**

Jack Erjavec & Robert scharff, **Automotive Technology, A system Approach**, 2nd Ed.

Crouse, W.H. and Anglin, D.L., **Automotive Mechanics,** 10th Ed.,

Santos, G.N. and Lebron G.B., **Chemistry.**

Don Kowels, **Basic Automotive Service and Maintenance.**

INFORMATION SHEET : 2

QUALIFICATION : Automotive Servicing NC I

UNIT OF COMPETENCY : Perform Periodic Maintenance of

Automotive Engine

MODULE TITLE : Performing Periodic Maintenance of

Automotive Engine

**LEARNING OUTCOME 2 : Inspect Engine**

**Engine Automotive Components**

**Physical Principles Related to Engine Operations**

* Energy conversion
* Atmospheric pressure
* Vacuum
* Pressure
* The relationship between temperature, pressure and volume
* The three states of matter.

Energy Conversion:

* Engines take heat energy and convert it into mechanical energy.
* Motors take electrical energy and convert it into mechanical energy.

Engine Components

* Cylinder block
* Piston
* Piston rings
* Piston pin
* Connecting rod
* Crankshaft Cylinder head
* Intake valve
* Exhaust valve
* Camshaft
* Timing gears
* Spark plug

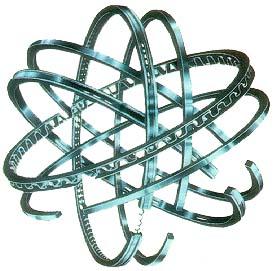
Cylinder Block



**Piston**- is sliding plug that harnesses the force of the burning gases in the cylinder.



Piston ring



Piston pin



Connecting Rod



CranK Shaft



QUALIFICATION : Automotive Servicing NC I

UNIT OF COMPETENCY : Perform Periodic Maintenance of

Automotive Engine

ngine

Automotive Engine

**LEARNING OUTCOME 3 : Service Engine**

PERFORMANCE CRITERIA

**LO 3 Service** **Engine**

3.1 Service and adjustment are carried out according to manufacture

Specification, workplace procedure and safety and environmental requirements

and without causing damage to components or system

3.2 Irregularities are recorded using inspection sheet according to workplace

procedures.

3.3 Post-service testing is carried out according workplace procedures.

3.4 PPEs are worn.

3.5 Safety Practices are applied

RESOURCES:

Jack Erjavec and Robert scharff, **Automotive Technology, A system Approach**, 2nd Ed.

Crouse, W.H. and Anglin, D.L., **Automotive Mechanics,** 10th Ed.,

Santos, G.N. and Lebron G.B., **Chemistry.**

Don Kowels, **Basic Automotive Service and Maintenance.**

INFORMATION SHEET : 3

UNIT OF COMPETENCY : Perform Periodic Maintenance of

Automotive Engine

MODULE TITLE : Performing Periodic Maintenance of

Automotive Engine

**LEARNING OUTCOME 3 : Service Engine**

**SELF CHECK : 3**

UNIT OF COMPETENCY : PERFORM PERIODIC MAINTENANCE OFAUTOMOTIVE

ENGINE

MODULE TITLE : Performing Periodic Maintenance of Automotive Engine

**LEARNING OUTCOME 3 : Service Engine**

ANSWER THE FOLOWING QUESTIONS:

1. The timer pointer in relation with the timing mark on the timing device hub during injection pump timing procedures should be \_\_\_\_\_\_\_\_\_\_\_\_
2. Near with each other
3. Far from each other
4. In line with each other
5. None of the above
6. Unless injection timing is considered, the engine will\_\_\_\_\_\_\_\_.
7. Still function normally
8. Run the engine but low in power
9. Inefficient in fuel consumption
10. Not operate as it is designed.
11. Which of the following should be done as a preliminary step before attempting an idle adjustment of a fuel injection system?
12. Blocking the drive wheels
13. Connecting the tachometer
14. Checking and adjusting base ignition timing
15. All of the above
16. Bottom-fed injectors are used in \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
17. Throttle body injection system
18. Port injection system
19. Both A and B
20. Neither A nor B

**ANSWER SHEET : LO 3**

UNIT OF COMPETENCY : PERFORM PERIODIC MAINTENANCE OFAUTOMOTIVE

ENGINE

MODULE TITLE : Performing Periodic Maintenance of Automotive Engine

**LEARNING OUTCOME 3 : Service Engine**

ANSWER:

1. The **Throttle Body Injection (TBI)** served as a steeping stone for the carburettors to more advance port fuel injection systems. The throttle body units is similar in size and shape to a carburettor and, like a carburettor, mounts on the intake manifold. The injector(s) spray fuel down into a throttle body chamber leading to the intake manifold. The intake manifold feeds the air/fuel mixture to all cylinders. While the **Port Fuel Injection (PFI)** systems use one injector at each cylinder. They are mounted in the intake manifold near the cylinder head where they can inject the fine, atomized fuel mist as close as possible to the intake valve.
2. D
3. D
4. B

QUALIFICATION : Automotive Servicing NC I

UNIT OF COMPETENCY : Perform Periodic Maintenance of

Automotive Engine

MODULE TITLE : **Performing Periodic Maintenance of**

**Automotive Engine**

**LEARNING OUTCOME 4 : Complete Work Processes**

PERFORMANCE CRITERIA

**LO 4: Complete work processes**

* 1. Initial quality inspection is performed based on workplace procedures.
  2. Vehicle is turned over to immediate supervisor for final inspection to ensure work done according to workplace standards expectations.
  3. Work area is restored following standard operating procedures.
  4. Waste management is practice according to 5s of good house keeping
  5. Tools and equipment are checked and stored according to work place procedures
  6. Workplace documentation is prepared according to workplace procedures

RESOURCES:

1. Jack Erjavec and Robert scharff, **Automotive Technology, A system Approach**, 2nd Ed.
2. Crouse, W.H. and Anglin, D.L., **Automotive Mechanics,** 10th Ed.,
3. Santos, G.N. and Lebron G.B., **Chemistry.**
4. Don Kowels, **Basic Automotive Service and Maintenance.**

INFORMATION SHEET : 4

UNIT OF COMPETENCY : Perform Periodic Maintenance of

Automotive Engine

MODULE TITLE : Performing Periodic Maintenance of

Automotive Engine

**LEARNING OUTCOME 4 : Complete Work Processes**

**SELF CHECK : 4**

UNIT OF COMPETENCY : PERFORM PERIODIC MAINTENANCE OFAUTOMOTIVE

ENGINE

MODULE TITLE : Performing Periodic Maintenance of Automotive Engine

**LEARNING OUTCOME 4 : Complete Work Processes**

ANSWER THE FOLOWING QUESTIONS:

1. The timer pointer in relation with the timing mark on the timing device hub during injection pump timing procedures should be \_\_\_\_\_\_\_\_\_\_\_\_
2. Near with each other
3. Far from each other
4. In line with each other
5. None of the above
6. Unless injection timing is considered, the engine will\_\_\_\_\_\_\_\_.
7. Still function normally
8. Run the engine but low in power
9. Inefficient in fuel consumption
10. Not operate as it is designed.
11. Which of the following should be done as a preliminary step before attempting an idle adjustment of a fuel injection system?
12. Blocking the drive wheels
13. Connecting the tachometer
14. Checking and adjusting base ignition timing
15. All of the above
16. Bottom-fed injectors are used in \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
17. Throttle body injection system
18. Port injection system
19. Both A and B
20. Neither A nor B

**ANSWER SHEET : LO 4**

UNIT OF COMPETENCY : PERFORM PERIODIC MAINTENANCE OFAUTOMOTIVE

ENGINE

MODULE TITLE : Performing Periodic Maintenance of Automotive Engine

**LEARNING OUTCOME 3 : Complete Work Processes**

ANSWER:

1. The **Throttle Body Injection (TBI)** served as a steeping stone for the carburettors to more advance port fuel injection systems. The throttle body units is similar in size and shape to a carburettor and, like a carburettor, mounts on the intake manifold. The injector(s) spray fuel down into a throttle body chamber leading to the intake manifold. The intake manifold feeds the air/fuel mixture to all cylinders. While the **Port Fuel Injection (PFI)** systems use one injector at each cylinder. They are mounted in the intake manifold near the cylinder head where they can inject the fine, atomized fuel mist as close as possible to the intake valve.
2. D
3. D
4. B