Apprenticeship Manitoba

Manitoba

Automotive Service Technician
Level 3

Rev. June 2018

Apprenticeship Manitoba

Automotive Service Technician

Unit: C1 Ignition Systems

Level: Three

Duration: 42 hours

Theory: 21 hours

Practical: 21 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about ignition systems when working with today's automotive vehicles and light trucks. Beginning with terminology and safe work practices, the unit covers types of ignition systems and circuits, and their components; the unit also covers the procedures used to adjust, diagnose, repair and replace ignition systems and their components.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with ignition systems.	**5%**
2. Identify hazards and describe safe work practices pertaining to ignition systems. a. High voltage	**5%**
3. Identify tools and equipment relating to ignition systems and describe their applications and procedures for use.	**10%**
4. Identify types of ignition systems and describe their components and operation. a. Distributor b. Distributorless c. Coil on plug	**25%**
5. Identify types of ignition circuits and describe their purpose and operation. a. Primary b. Secondary	**25%**
6. Describe and demonstrate the procedures used to diagnose ignition systems and their components.	**20%**
7. Describe and demonstrate the procedures used to adjust, repair and/or replace ignition systems and their components.	**10%**

***

Apprenticeship Manitoba

Automotive Service Technician

Unit: C2 Gasoline Fuel Systems

Level: Three

Duration: 56 hours

Theory: 28 hours

Practical: 28 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about gasoline fuel systems when working with today's automotive vehicles and light trucks. Beginning with terminology and safe work practices, the unit covers types of gasoline fuel injection systems and their components; the unit also covers the procedures used to adjust, diagnose, repair and replace gasoline fuel injection systems and their components.

Objectives and Content:	Percent of Unit Mark (%)
1. Define terminology associated with gasoline fuel systems.	**10%**
2. Identify hazards and describe safe work practices pertaining to gasoline fuel systems. a. Handling, disposal and storage of fuels b. Depressurize fuel systems and fuel recovery c. High pressure d. Flammability	**10%**
3. Identify tools and equipment relating to gasoline fuel systems and describe their applications and procedures for use.	**10%**
4. Identify types of fuels and describe their characteristics and properties. a. Gasoline b. Diesel c. Alternate	**10%**
5. Identify types of fuel delivery and injection systems, and describe their components and operation. a. Mechanical b. Electrical	**25%**
5. Identify types of fasteners, tubing, hoses, gaskets, seals and sealants and describe their applications.	**10%**
6. Describe and demonstrate the procedures used to diagnose and repair fuel delivery and injection systems. a. Pressure testing	**25%**

b. Volume testing
c. Contamination
d. Adjustment procedures
e. Component replacement

***

Apprenticeship Manitoba

Automotive Service Technician

Unit: C3 Gasoline Emission Control Systems

Level: Three

Duration: 14 hours

Theory: 10 hours

Practical: 4 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about emission control systems when working with today's automotive vehicles and light trucks. Beginning with terminology and safe work practices, the unit covers types of emission control systems and their components; the unit also covers the procedures used to adjust, diagnose, repair and replace emission control systems and their components.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with gasoline emission control systems.	**10%**
2. Identify hazards and describe safe work practices pertaining to gasoline emission control systems.	**5%**
3. Identify tools and equipment relating to gasoline emission control systems and describe their applications and procedures for use.	**10%**
4. Identify types of on-board diagnostic systems and describe their applications. a. OBD I b. OBD II	**10%**
5. Identify types of emission gases. a. CO b. CO_2 c. NOx d. HC e. O_2	**10%**
6. Identify gasoline emission control systems and describe their components and operation. a. Exhaust gas recirculation (EGR) b. Evaporative emission control systems (EVAP) c. Secondary air injection d. Exhaust system e. Positive crankcase ventilation (PCV) f. Induction system g. Variable cam-timing (VCT)	**30%**

7.	**Identify types of fasteners, tubing, hoses, gaskets, seals and sealants and describe their applications.**	**5%**
8.	**Describe and demonstrate the procedures used to diagnose and repair gasoline emission control systems and their components.**	**20%**

****

Apprenticeship Manitoba

Automotive Service Technician

Unit: C4 Intake and Exhaust Systems

Level: Three

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about intake and exhaust systems when working with today's automotive vehicles and light trucks. Beginning with terminology and safe work practices, the unit covers types of intake and exhaust systems and their components; the unit also covers the procedures used to adjust, diagnose, repair and replace intake and exhaust systems and their components.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with intake and exhaust systems.	**10%**
2. Identify hazards and describe safe work practices pertaining to intake and exhaust systems.	**5%**
3. Identify tools and equipment relating to intake and exhaust systems and describe their applications and procedures for use.	**10%**
4. Identify types of intake and exhaust systems and describe their components and operation.	**20%**
5. Identify intake air systems and describe their components and operation. a. Forced air • Turbocharged • Supercharged b. Naturally aspirated (NA)	**15%**
6. Identify types and sources of induction and exhaust system problems. a. Leaks b. Blockages c. Noise d. Vibration	**15%**
7. Identify types of fasteners, tubing, hoses, gaskets, seals and sealants and describe their applications.	**5%**
8. Describe the procedures used to diagnose and repair intake and exhaust systems and their components.	**20%**

***

Apprenticeship Manitoba

Automotive Service Technician

Unit: C5 Vehicle Management Systems

Level: Three

Duration: 49 hours

Theory: 21 hours

Practical: 28 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about vehicle management systems when working with today's automotive vehicles and light trucks. Beginning with terminology and safe work practices, the unit covers types of vehicle management systems and their components; the unit also covers the procedures used to adjust, diagnose, repair and replace vehicle management systems and their components.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with vehicle management systems.	**10%**
2. Explain basic computer operation and its relationship to vehicle management systems.	**10%**
3. Identify tools and equipment used to diagnose network and electronic circuitry and describe their applications and procedures for use. a. Digital volt ohmmeter (DVOM) b. Scopes c. Probes d. Break out boxes e. Scan tools	**10%**
4. Identify on-board diagnostic (OBD) systems and describe their components and operation. a. OBD I • Diagnostic trouble codes (DTC) b. OBD II • Drive cycles and monitors • DTC	**15%**
5. Identify types of network protocols and describe their purpose.	**10%**
6. Describe the networking of modules and multi-plexing. a. Wiring designs b. Wireless	**10%**
7. Identify methods used to access/transfer and reprogram software and describe	**5%**

their associated procedures.

8.	**Identify the parameters of inputs and outputs and describe their relationships.**	**10%**
9.	**Describe and demonstrate the procedures used to diagnose and repair vehicle management systems.**	**20%**

****

Apprenticeship Manitoba

Automotive Service Technician

Unit: C6 Transfer Cases and 4WD/AWD Systems

Level: Three

Duration: 21 hours

Theory: 14 hours

Practical: 7 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about transfer cases and 4WD/AWD systems when working with today's automotive vehicles and light trucks. Beginning with terminology and types of transfer cases and 4WD/AWD systems, the unit covers transfer case control systems, power flow and gear ratios; the unit also covers the procedures used to adjust, diagnose, repair and replace transfer cases and 4WD/AWD systems and their components.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with transfer cases and 4WD/AWD systems.	**10%**
2. Identify types of transfer cases used with 4WD/AWD systems, and describe their components and operation.	**25%**
3. Describe the relationship between transfer cases, locking hubs, and axle disconnects.	**10%**
4. Identify tools and equipment relating to transfer cases and 4WD/AWD systems, and describe their applications and procedures for use.	**5%**
5. Identify types of transfer case control systems and describe their components and operation. a. Vacuum b. Manual c. Electronic	**10%**
6. Explain power flow as it relates to transfer cases and 4WD/AWD systems.	**5%**
7. Describe gear ratios, their purpose and calculations.	**5%**
8. Identify types of lubricants, fasteners, gaskets, seals and sealants and describe their applications.	**5%**
9. Describe the procedures used to diagnose transfer cases and 4WD/AWD systems.	**5%**
10. Describe and demonstrate the procedures used to adjust, repair and/or replace transfer cases and 4WD/AWD systems, and their related components.	**20%**

***

Apprenticeship Manitoba

Automotive Service Technician

Unit: C7 Electrical Options and Accessories

Level: Three

Duration: 21 hours

Theory: 14 hours

Practical: 7 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about electrical options and accessories when working with today's automotive vehicles and light trucks. Beginning with terminology and safe work practices, the unit covers types of electrical options and accessories, and their components and operation; the unit also covers the procedures used to adjust, diagnose, repair and replace electrical options and accessories, and their related components.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with electrical options and accessories.	**5%**
2. Identify hazards and describe safe work practices pertaining to electrical options and accessories.	**5%**
3. Identify tools and equipment relating to electrical options and accessories and describe their applications and procedures for use.	**5%**
4. Identify types of electrical options and accessories and describe their components and operation. a. Accessories b. Theft deterrents c. Audio/video d. Navigation e. Remote starter f. Other emerging technologies	**45%**
5. Describe the procedures used to diagnose electrical options and accessories.	**20%**
6. Describe the procedures used to adjust, repair and/or replace electrical options and accessories and their related components.	**20%**

***