

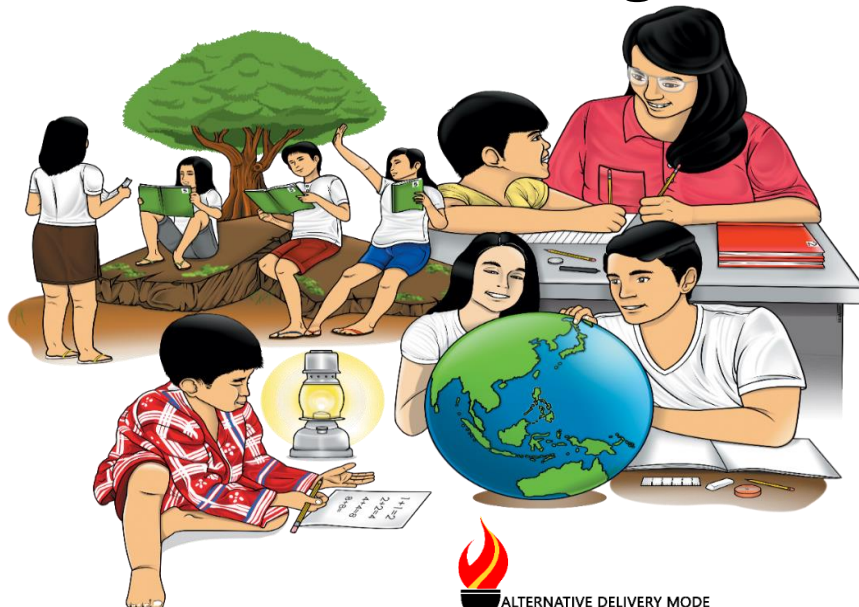
Special Program in Technical Vocational Education

Quarter 1 – Module 7

Testing and Repairing Wiring/Lighting System

(Explaining automotive lighting system
and its functions)

Automotive Servicing NC II



10

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Automotive Servicing NC II

IA-Automotive Servicing – Grade 10
Alternative Delivery Mode
Quarter 1 – Module 7: Testing and Repairing Wiring/ Lighting System
(Explaining automotive lighting system and its functions)

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLMS is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and test. And read the instructions carefully before performing each task.

If you have questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learner.

For the facilitator:











Hi, as a facilitator you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Kindly, advise the learner's parents or guardians of the same procedure since they will be the primary supporters in the learners' progress. Please, do not forget to remind the learner to use separate sheets in answering all of the activities found in the learning module.

For the learner:

Hello learner, Welcome to the Automotive Servicing NC II Alternative Delivery Mode (ADM) Module on Testing and Repairing Wiring/Lighting System (Explain Automotive Lighting System and its Functions). I hope you are ready to progress in

your Grade 10 SPTVE in Automotive with this learning module. This is designed to provide you with interactive tasks to further develop the desired learning competencies prescribed in our curriculum. With this, you are expected to appreciate staking through the information and activity given.

This module has the following parts and corresponding icons:

ICON	LABEL	DETAIL
	What I Need to Know	This contains the learning objectives which you need to accomplish.
	What I Know	This evaluates what you know about the lesson you are to learn.
	What's In	This connects the current lesson with a topic necessary in your understanding.
	What's New	This introduces the lesson through an activity.
	What Is It	This contains a brief discussion of the learning module lesson.
	What's More	These are activities to check your understanding of the lesson.
	What I Have Learned	This summarizes the important ideas presented in the lesson.
	What I Can Do	This is a real-life application of what you have learned.
	Assessment	This is a post assessment of what you have learned.
	Additional Activity	This is an activity that will strengthen your knowledge about the lesson.

At the end of this module you will also find:

References

This is a list of all sources used in developing this module.

Answer Sheet

This is where you will write your answers.

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LESSON

7

Explaining automotive lighting system and its functions

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!



What I Need to Know

This module was designed and written to guide you to acquire the learning competencies and develop your skills in Explaining the Function of Ignition System Components in IA- Automotive Servicing. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. However, the order in which you read the module can be changed to correspond with the textbook you are now using.

Quarter/Week

Learning Competency Code

Learning Competency

Q1/W7

SPTVE_IAAUS9-12TRW-IIIc-d-10

LO 2. Explain Automotive Lighting System and its Functions.

Learning Objectives:

After going through this module, you are expected to:

1. familiarize and explain the different components of the lighting system;
2. label the different components of the lighting system, and;
3. recognize and value the importance of the different lighting system.



What I Know

Pre-Test/Assessment

Multiple choice

Direction: Choose the LETTER of the best answer. Write your answer in the answer sheet.

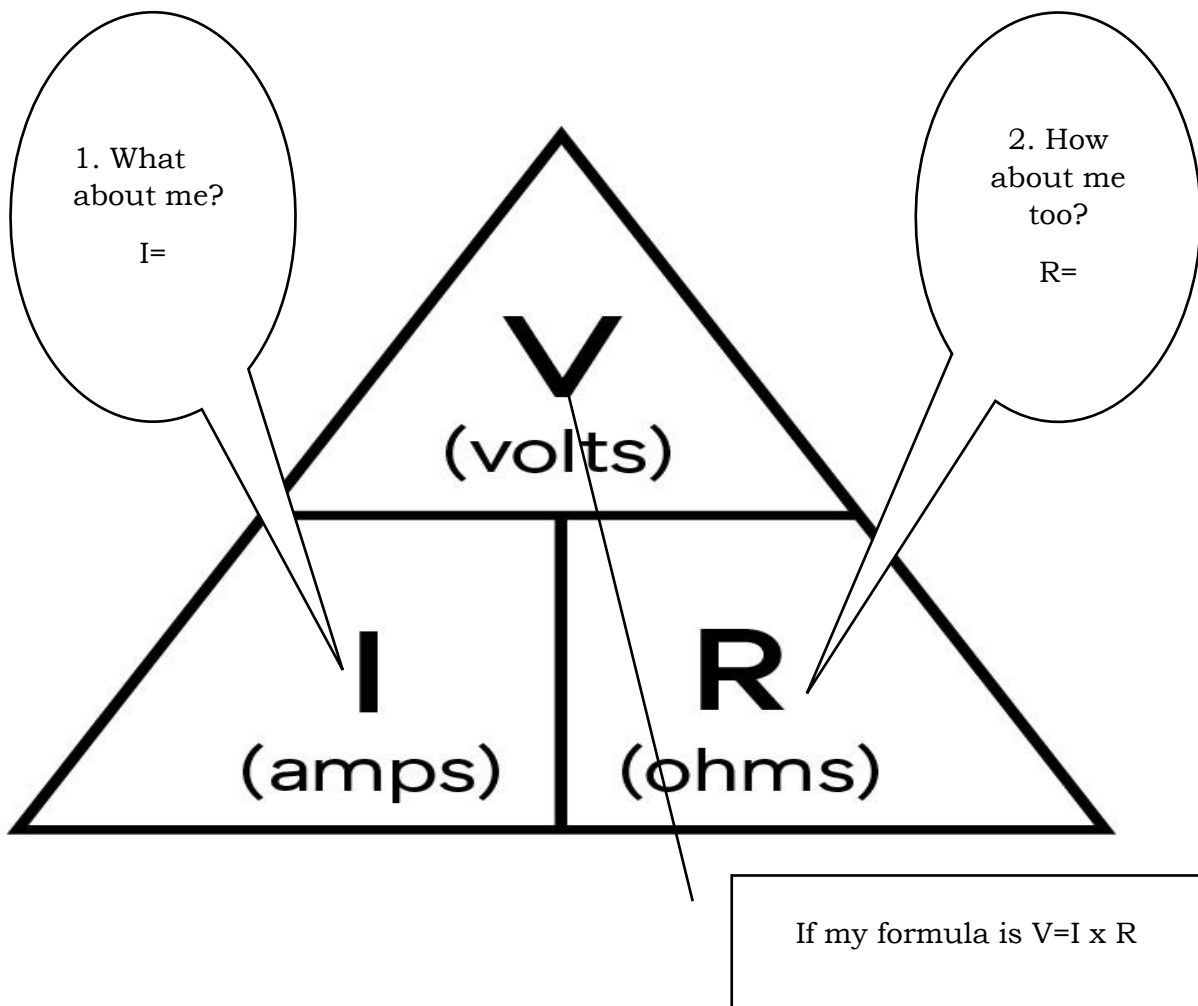
1. The exterior lights consist of several components except one.
a. Dome light b. Parking light c. Signal light d. Stop light
2. The type of switch that controls the high and low headlamp beam function.
a. Dimmer switch b. Hazard switch c. Signal switch d. Stop light switch
3. The light that illuminate when the brake pedal is applied.
a. Back-up light b. Hazard light c. Signal light d. Stop light
4. The back-up light switch is mounted on the side of the _____.
a. brake pedal b. differential c. engine d. transmission
5. The light that flashes from either left or right and is used by the driver when changing lanes.
a. Back-up light b. Head light c. turn signal light d. stop light
6. Lights that are found on _____, are the dome light, instrument light, in the dash board.
a. exterior lights c. side marker lights
b. interior lights d. turn signal lights
7. A device that is being operated by the brake pedal that switches the stop light ON and OFF.
a. Back-up light switch c. Signal switch
b. Dimmer switch d. Stop light switch
8. Part of a circuit that consumes electrical current.
a. control b. load c. path d. power source
9. Part of a circuit that connects the power source to the load so that there is a complete circuit.
a. control b. load c. path d. power source
10. The function of lighting system is to?
a. act as the warning signals
b. enhance the visibility of an automobile.
c. provides illumination for the driver of a vehicle to drive safely in the dark.
d. all of these
11. The following are lights located at the rear of the vehicle except one.
a. Headlight b. park light c. plate light d. reverse light
12. The following are the lights located on the front of the vehicle except one.
a. hazard light b. head light c. signal light d. stop light
13. The other term for brake light.
a. back-up light b. plate light c. reverse light d. stop light

14. A lighting system component that is directly operated by the driver when light is needed?
 a. Flasher relay b. Bosch relay c. Fuses d. Switch
15. A lighting system component that is used to protect lighting
 a. Flasher relay b. Bosch relay c. Fuses d. Switch



What's In

Directions: Answer what is being ask on the diagram below. Write your answer in the answer sheet.





What's New

Direction: Based on the given picture, explain briefly what is being asked below the picture. Explain your answer in a separate paper.

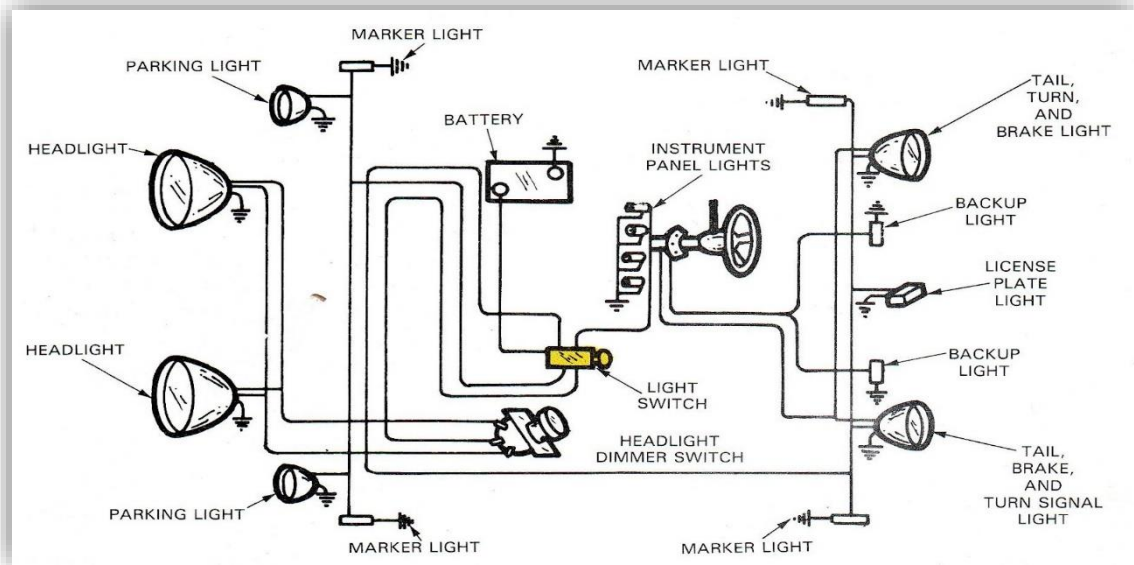


Assuming that this vehicle can still be driven, do you think this can be driven on highways or is this safe to be used during traffic or even night time?



What Is It

AUTOMOTIVE LIGHTING SYSTEM AND COMPONENTS



Introduction:

Lighting system plays an important role on a vehicle. It enables the driver to see everything that is on the road. Additionally, these lighting system enable other drivers to see other vehicles on the way. It significantly contributes to preventing the occurrences of accidents, especially at night. In other words, lighting system is also about security and communications.

The lighting system of an automobile comprises of various lighting and signaling devices or components fixed in the front, sides, and rear of the vehicle. Automobile lighting system has multiple functions as follows:

- It provides illumination for the driver of a vehicle to drive safely in the dark.
- Automobile lights enhance the visibility of an automobile.
- Automobile lights act as the warning signals. With lights the car's presence, position, size, speed, and direction are detected by other motorists.

LIGHTING SYSTEM

TWO CLASSIFICATION OF LIGHTING SYSTEM

1. EXTERIOR LIGHTS

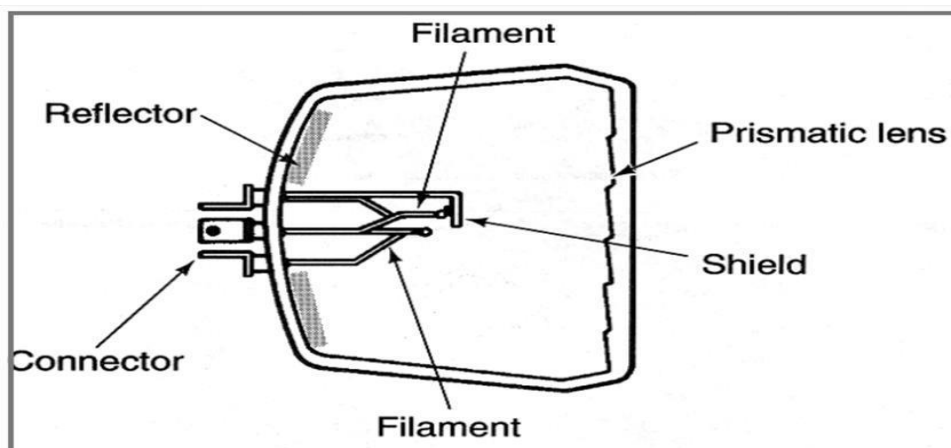
Exterior lightings are the lights located outside the vehicle and are used to ensure that road users perceive the presence of the vehicle, recognize a driver's intentions, and can react accordingly to them.

Typically, these include the headlights, signal lights, hazard warning lights, stoplights, parking lights, tail lights, license plate lights, back up lights, and side marker lights

a. Headlight

It is considered as the main light of the vehicle for it illuminates the way ahead when traveling night time. These lights are really powerful and have reflectors as well. There are three various lights that a headlight provides namely; high beam, low beam and the bi-pass.

Basic Parts of a Headlight



Types of a Headlight

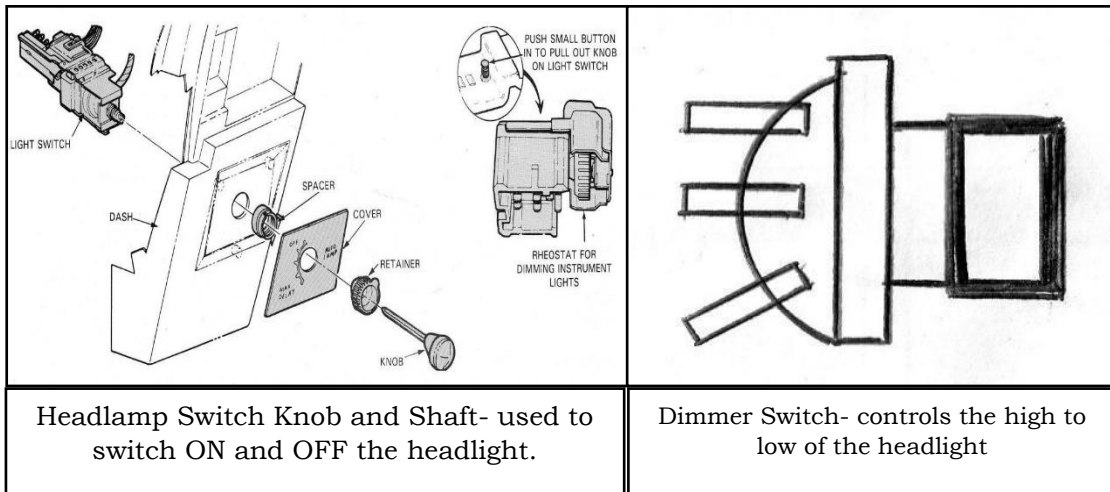
- a. Sealed beam headlight- this kind of headlight has no separate lightbulb instead the whole assembly itself is a light bulb. This commonly used in old vehicles.



- b. Semi-sealed beam type headlight- This type of headlight allows bulb replacement unlike in the sealed beam headlight. Since the bulb alone can be replaced, it is not necessary to replace the whole headlight assembly. This type is commonly used by modern vehicles.



Headlight Switches



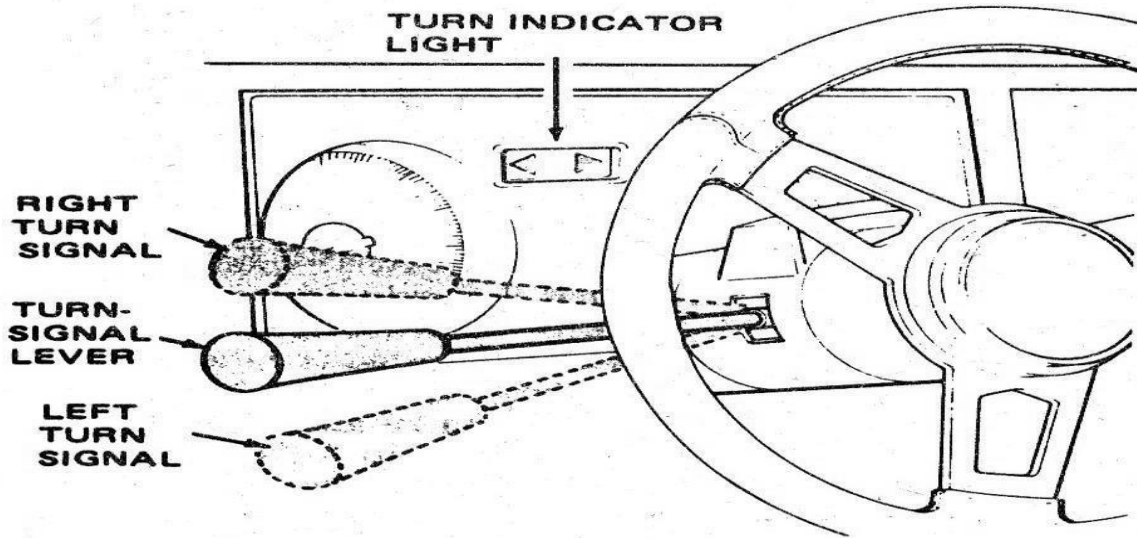
This type can be seen on old vehicles



This type is used in modern vehicles.

b. Turn Signal Light

Sometimes called as directional light. The turn signal light is used by the driver to indicate his/her intention of driving either to the right or to the left. A directional signal light switch is used by the driver to operate the right signal lights if his/her intention is to drive to the right, or the left signal lights if he is proceeding to the left.



Depending on the car manufacturer, the turn signal light switch may be located at the right or left of the steering wheel.

c. Park Light

These are small, low-powered lights traditionally found within either within – or separate to – the headlight assembly. These lights are designed to highlight the extremities of the car at dawn and dusk or in bad weather, when it isn't dark enough to necessitate use of the headlights.

Park lights are used for warning or signaling the driver ahead about the presence of another vehicle.



d. Side-Marker Lights

Side marker lights are illumination devices attached to the front and rear sides of motorized vehicles and trailers. It is used to show the length and width of the vehicle.



In long vehicles, side marker light specifically the lights that are installed near the wheels were all color white for it guides the driver in checking the wheels of the vehicle is in good condition.



e. Fog Light

Fog lamps are intended to provide an adjunct to the low beams. Because fog hovers close to the ground, the lamps are designed to shine down, illuminating the road beneath the fog.



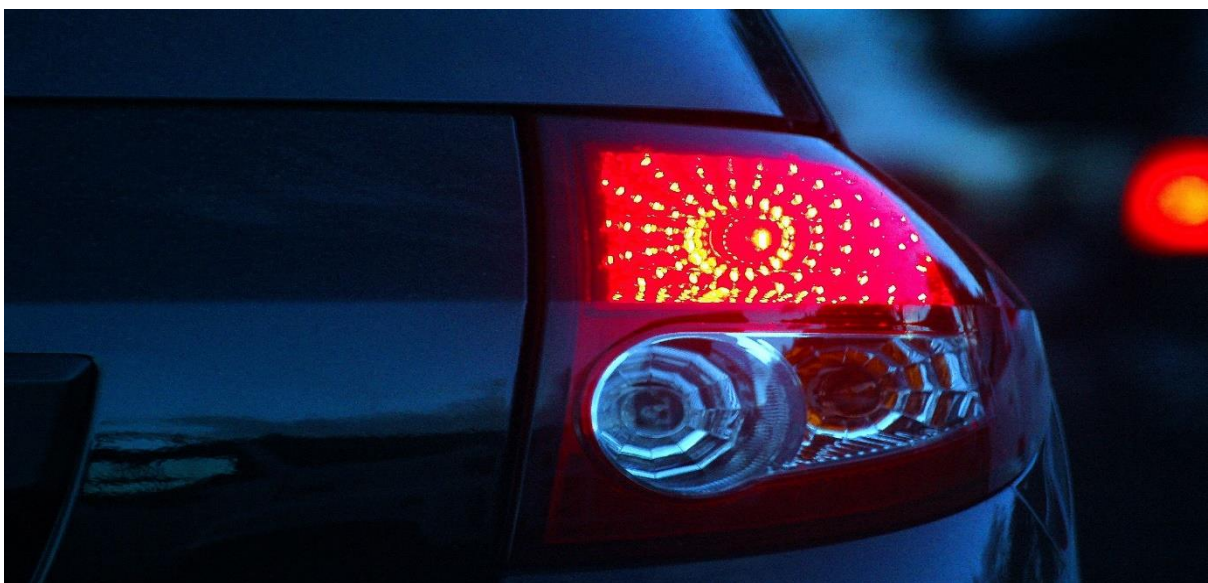
f. Brake Light

Also called as stop light. The red light attached to the rear of a motor vehicle that lights up when the brakes are applied, serving as a warning to following drivers.



g. Tail Light

Tail lights are the lamps, usually covered by a red or translucent body, which are installed at the rear end of an automobile. Tail lights provide a safety aspect of the vehicle. They show the rear edge of the vehicle to allow other drivers to appropriately gauge the size and shape of the car. In addition, they allow other vehicles to see the car in inclement weather such as rain or snow. Tail light and park light has a common switch in a modern vehicle.



Note: Tail lights are dimmer than brake lights

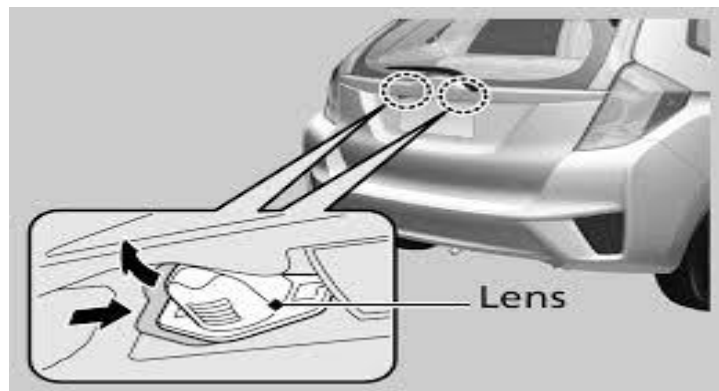
h. Back-up Light

Sometimes called as reverse light. Illuminate the back of the car when the transmission is shifted into reverse. It provides extra illumination to allow the driver to see behind the vehicle when backing-up at night and it warns following vehicles that the vehicle is in reverse. Lamps are normally covered by a white transparent body.



i. License Plate Light

It is used to illuminate the license plate on the rear of vehicle.



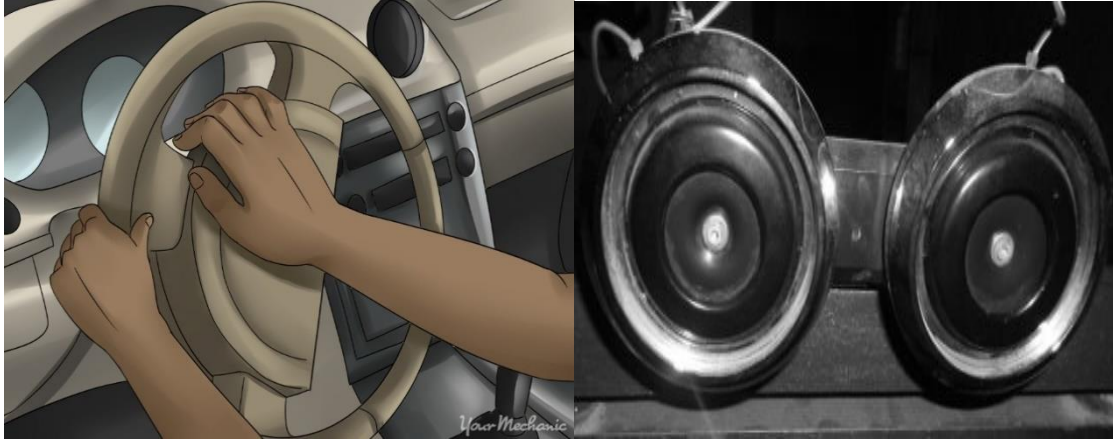
j. Hazard Light

Designed to signal following cars that a car has stopped or stalled or has pulled up to the side of the road. It is when all turn signal lights flash together. It is used during emergency situations and accompanied with **horn**.



- **Horn**

The horn is an electromechanical device consisting of a switch, wiring, and a buzzer which produces noise when activated. It is used to warn or communicate to other drivers. Large trucks often use air horns which sound louder.



2.INTERIOR LIGHTS

The interior lights include instrument panel lights, various warning and indicator lights, and courtesy lights that turn on when a car door is opened.

Most vehicles have interior lights that are also called dome lights or courtesy lights. These can be located on the ceiling of the vehicle and illuminate when people enter or exit the car. The lighting normally stays lit until the vehicle is turned on so the passengers can safely fasten their seat belts.

a. Instrument Panel Lights

Lights that are used to illuminate the panel board that houses various gauges and lights which provide the driver with important information about the status of the vehicle.



b. Dome Light

It is found inside the vehicle so that the passengers or driver could easily get in or out in the vehicle.



Dome light usually found in the passenger utility vehicle.

c. Courtesy light

A small light in a car that is automatically switched on when one of the doors is opened.



ELECTRICAL COMPONENTS USED IN LIGHTING SYSTEM

1. Flasher Relay



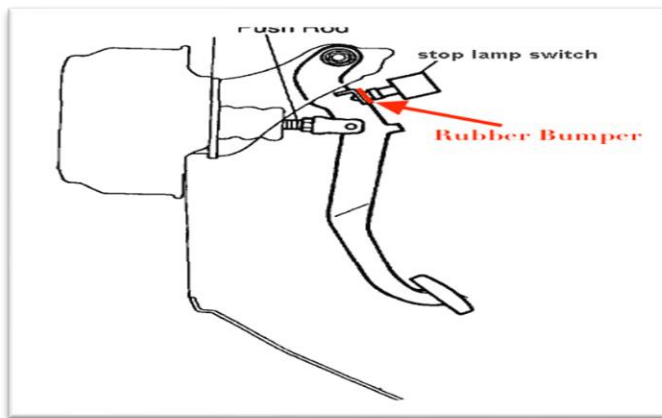
An automatic-reset circuit breaker used in directional signal and hazard warning circuits. When damaged, signal lights won't flash or lights steadily.

2. Hazard Switch



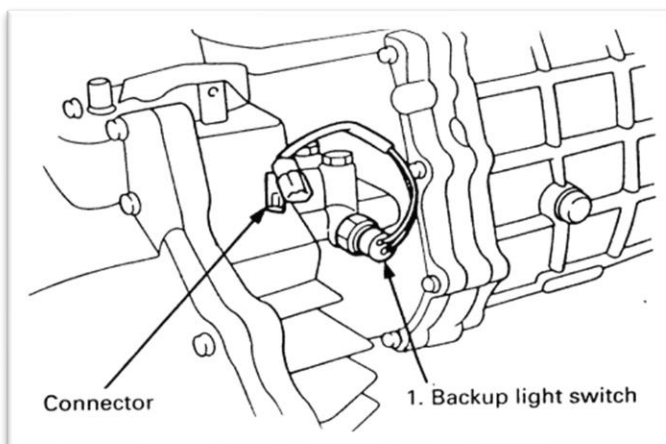
A device operated by the driver to indicate a vehicular hazard by flashing all signal lights together.

3. Brake/ Stop Light Switch



The brake light switch is normally mounted on the brake pedal.

4. Back-Up Light Switch



The back-up light switch closes the light circuit when the transmission is shifted into reverse, to illuminate the area behind the car.

5. Bosch Relay



Bosch relays are used to switch electrical devices featuring high power levels or which are sensitive to voltage loss. Relays relieve the load on control switches and make for small voltage drops with economical conductor cross-sections.

6. Combination Switches



Late model vehicles combine switch controls into a single column mounted switch assembly so that the driver has ready access to systems such as windshield wipers and washer, turn signals, and headlights. These are all designed within a single multi-function switch so that the driver is able to keep his hands on the steering wheel during adverse weather or driving condition that would require the use of this system.

7. Horn Switch



Operated by the driver to sound the horn.

8. Fuses



Commonly used fuses in electrical system. Automotive fuses are used to protect the wiring and electrical equipment for vehicles.

OCCUPATIONAL HEALTH AND SAFETY PRACTICES

Safety Measure's in Repairing Electrical Circuit

Safety is a basic requirement an any job to be done. To this end, each individual is responsible for understanding and applying safety rules, standards, and regulations. In all activities, safety consciousness will help prevent personal injury and damage to property.

Before conducting any electrical related activities, make sure you have the following;

- Safe working tools, equipment, and materials.
- Body and eye protective covering when needed.
- Appropriate ventilation is available at the workplace.
- Take notice of violence and stress-related incidents at the workplace.

The electrical circuit of the vehicle is becoming very complex. There may be over 50 light bulbs and hundreds of feet of wiring in the lighting circuits. The circuits include protectors, switches, lamps, and connectors.

Any failure requires a systematic approach to diagnose, locate, and repair or correct the fault immediately. When performing repairs on the lighting or electrical circuits/systems, the repairs must assure vehicle safety and should meet all the applicable laws. Be sure to use the correct lamp type and size for the application.






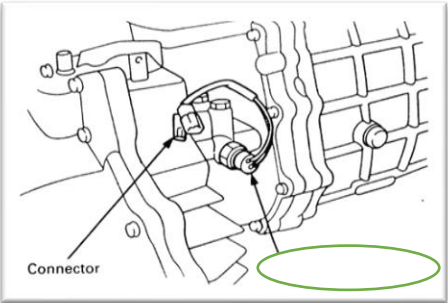

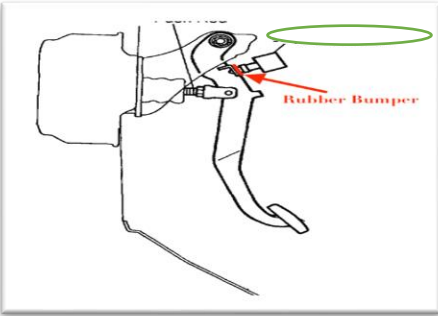
Before performing any lighting systems test or repair, check the battery connections. Also be sure that all cable connections are removed. Visually check the wires for damage and insulation, loose connections, and improper routing.

Take Note: Driving a vehicle with even just one lighting system failure has a corresponding penalty so make sure all your lights are working before traveling.



What's More

Directions: Name the following electrical components mostly used in electrical system. Write your answers in the answer sheet.

1.		5.	
2.		6.	
3.		7.	
4.		8.	



What I Have Learned

Directions: Explain your answer in a separate paper.

As a future car owner and a driver in the future, how are you going to rate the importance a vehicle lighting system is based on the following;

- 8- not important,
- 9- least important
- 10- very important?



What I Can Do

Direction: Label the different kinds of lighting system used in a car. Write your answers in the answer sheet.





Post-Assessment

Multiple choice

Direction: Choose the LETTER of the best answer. Write your answer in the answer sheet.

1. It is considered as the main light of the vehicle for it produces the most powerful light to illuminate the road ahead when travelling at night?
 - a. Fog light
 - b. Hazard light
 - c. Headlight
 - d. Park light
2. A light located below the headlight and is used during foggy condition?
 - a. Fog light
 - b. Hazard light
 - c. Headlight
 - d. Park light
3. It is when all turn signal light flashes together. It is generally used during emergency situations?
 - a. Fog light
 - b. Hazard light
 - c. Headlight
 - d. Park light
4. It used to warn the vehicle ahead of your presence, it is being turned on at dawn or in rainy season instead of using the headlight.
 - a. Fog light
 - b. Hazard light
 - c. Headlight
 - d. Park light
5. A flashing light that is used by the driver when changing lanes?
 - a. Directional light
 - b. Doom light
 - c. License Plate light
 - d. Tail light
6. A light that illuminates the plate number of the vehicle?
 - a. Directional light
 - b. Doom light
 - c. License Plate light
 - d. Tail light

7. The dimmer red light at the rear of the vehicle that is used to warn the vehicle behind of the presence of another vehicle.
 - a. Directional light
 - b. Doom light
 - c. License Plate light
 - d. Tail light
8. A light located inside a vehicle that provides illumination to passengers in a public utility vehicle?
 - a. Directional light
 - b. Doom light
 - c. License Plate light
 - d. Tail light
9. It automatically switches on as the driver depresses the brake pedal.
 - a. Back-up light
 - b. Brake/stop light
 - c. Courtesy light
 - d. Side marker light
10. It automatically switches on as the driver shifted transmission in reverse?
 - a. Back-up light
 - b. Brake/stop light
 - c. Courtesy light
 - d. Side marker light
11. A light located inside the vehicle that switches on when door is opened.
 - a. Back-up light
 - b. Brake/stop light
 - c. Courtesy light
 - d. Side marker light
12. A light located at the front and rear side of the vehicle and is used as indication on how long or wide a vehicle?
 - a. Back-up light
 - b. Brake/stop light
 - c. Courtesy light
 - d. Side marker light
13. A lighting system component that is responsible in the flashing of signal and hazard light?
 - a. Bosch relay
 - b. Flasher relay
 - c. Fuses
 - d. Switch
14. A lighting system component that is directly operated by the driver when light is needed?
 - a. Bosch relay
 - b. Flasher relay
 - c. Fuses
 - d. Switch
15. A lighting system component that is used to protect lighting
 - a. Bosch relay
 - b. Flasher relay
 - c. Fuses
 - d. Switch



Additional Activity

Directions: Answer the question. Write your answer in the answer sheet.

What are the things needed and observed when conducting any electrical related activities?

- 1.
- 2.
- 3.
- 4.



Answer Key

What I Know

1. A
2. A
3. D
4. D
5. C
6. B
7. D
8. B
9. A
10. D
11. A
12. D
13. D
14. D
15. C

What's In

$$I=V/R$$

$$R=V/I$$

What's New

Answers may vary

What's More

1. Combination Switch
2. Fuses
3. Flasher Relay
4. Bosch Relay
5. Horn Switch
6. Hazard Switch
7. Back-up Light Switch
8. Stop/Brake Light Switch

What I Have Learned

Answers may vary

What I Can Do

1. Fog Light
2. Head Light
3. Park Light
4. Signal
5. Light/Hazard Light
6. Tail Light
7. Back-up/Reverse Light
8. Stop/Brake Light
9. Doom/Courtesy Light
10. License Plate Light

Post Assessment

1. C
2. A
3. B
4. D
5. A
6. C
7. D
8. B
9. B
10. A
11. C
12. D
13. B
14. D
15. C

Additional Activity

1. Safe working tools, equipment, and materials.
2. Body and eye protective covering when needed.
3. Appropriate ventilation is available at the workplace.
4. Take notice of violence and stress-related incidents at the workplace.

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Strengthened Technical - Vocational Education Program (STVEP)-
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