

Assessment Requirements

Unit MET02K – Knowledge of Removing and Fitting Electrical Components

Content:

Basic electrical and electronic principles and electrical circuits

- a. Quantities:
 - i. basic volt (electrical pressure)
 - ii. ampere (electrical current)
 - iii. ohm (electrical resistance)
 - iv. watt (power)
- b. The requirements of an electrical circuit:
 - i. battery
 - ii. cables
 - iii. switch
 - iv. current consuming device
- c. The direction of current flow and electron flow.
- d. Simple series and parallel circuits.
- e. Earth and insulated return.
- f. Cable sizes and colour codes.
- g. Types of connectors, terminals and circuit protection devices.
- h. Common electrical and electronic symbols.
- i. The meaning of:
 - i. short circuit
 - ii. open circuit
 - iii. bad earth
 - iv. high resistance
 - v. electrical capacity
- j. The basic principle of vehicle electronics and solid state.
- k. procedures involved in carrying out the systematic removal and fitting of electrical components
 - i. batteries
 - ii. headlamps
 - iii. wiper systems
 - iv. electric window systems
- l. electrical system components
 - i. batteries
 - ii. headlamps
 - iii. wiper systems
 - iv. electric window systems

Vehicle electrical wiring diagrams

- a. Interpret circuits to include:
 - i. vehicle lighting
 - ii. auxiliary circuits
 - iii. indicators

Vehicle batteries

- a. The construction and principles of vehicle batteries.

Vehicle lighting and auxiliary systems

- a. Identify the function and operating principles of:
 - i. types of switches
 - ii. circuit protection devices
 - iii. relays
 - iv. types of bulb
 - v. front and tail lamps
 - vi. main and dip beam headlamps
 - vii. lighting and dip switch
 - viii. window winding
 - ix. heating and ventilation systems, fan and heater
 - x. door mirror mechanisms
 - xi. interior lights and switching
 - xii. directional indicators
- b. The statutory lighting requirements when using a vehicle on the road.
- c. The need for headlamp adjustment.

Requirements of electrical and electronic systems

- a. The requirements for checking security and cleanliness of components, connections, correct operation of components and instruments, battery electrolyte, headlamp alignment, drive belt wear and tension.
- b. The basic procedures for checking the operation of electrical circuits:
 - i. use of multi-meters, volt, amps, ohms
 - ii. checking voltage supply
 - iii. checking current flow and consumption
 - iv. checking resistance and volt drop
 - v. checking lamp operation, dip and main beam
 - vi. checking indicators
- c. Safety precautions when working on electrical and electronic circuits to include:
 - i. disconnection and connection of battery
 - ii. avoidance of short circuits
 - iii. circuit protection

Procedures to prevent damage to the vehicle, components and contents when removing, storing and refitting components

- a. The methods that can be used to protect undamaged items to ensure they are removed and refitted without causing unnecessary damage:
- b. The procedures for the correct storage of vehicle contents.
- c. The process for the reporting of extra damage and items that may have broken when removed or refitted.

Types of clips and fixings

- a. The following types of clips and identify reasons and limitations for their use:
 - i. speed
 - ii. 'c'
 - iii. 'd'
 - iv. 'j' type captive nut
 - v. 'r'
 - vi. 'u' type captive nut
 - vii. cable clip
 - viii. trim clips
- b. The following types of fixings and identify reasons and limitations for their use:
 - i. pop rivet

- ii. plastic rivet
- iii. plastic capture nut
- iv. nut and bolt
- v. shoulder bolt
- vi. 'Nyloc' type nuts
- vii. washers
- viii. 'Spring' type washers
- ix. self tapping screws and bolts
- x. quick release plastic trim fastenings
- xi. trim tapes
- xii. adhesives and sealers

The processes involved when carrying out quality checks

- a. Items that may have been 'workshop' soiled and describe processes for rectifying:
 - i. door cards
 - ii. seats
 - iii. carpets
 - iv. boot and bonnet trims
- b. Methods for checking gaps.
- c. The process for checking and aligning headlamps:
 - i. address handling procedures for halogen bulbs
 - ii. address handling and health and safety issues relating to xenon bulbs and systems
- d. Operational checks and rectification methods to include:
 - i. lights
 - ii. washers and wipers
 - iii. Supplementary Restraint Structure (SRS) systems (checking not rectification)
 - iv. charging system (checking not rectification)
 - v. horn
 - vi. fluid levels
 - vii. interior switches
 - viii. operation of door lock mechanisms

Electrical Components

- a. Batteries
- b. Headlamps
- c. Wiper systems
- d. Electric Window Systems