

## Assessment Requirements

### Unit MC12K – Knowledge of Diagnosis and Rectification of Motorcycle Transmission and Driveline Faults

#### Content:

#### Electrical and electronic principles related to motorcycle transmission systems

- a. The operation of electrical and electronic systems and components related to motorcycle transmission systems including:
  - i. Control units
  - ii. sensors and actuators
  - iii. electrical inputs & outputs
  - iv. voltages
  - v. oscilloscope patterns
- b. The interaction between the electrical/electronic system, and mechanical components of the transmission systems.
- c. Electronic and electrical safety procedures.

#### The operation motorcycle clutches

- a. The construction and operation of friction clutches (wet, and dry) including single and multi-plate clutch designs.

#### The operation of motorcycle transmissions and driveline systems

- a. The construction and operation of manual gearboxes:
  - i. gear arrangements
  - ii. shaft and bearing arrangements
  - iii. selector mechanisms
  - iv. linkages
  - v. lubrication
- b. The construction and operation of automatic gearboxes and method for achieving different gear ratios.
- c. Interaction between mechanical, electrical and electronic components
- d. The construction and operation of continuously variable transmissions (CVT) and the benefits of this type of gearbox design.
- e. The construction and operation of final drive systems including:
- f. Chain and sprocket
- g. Belt systems
  - i. conventional crown wheel and pinion
- h. The construction and operation of motorcycle hub arrangements.
- i. The construction and operation of:
  - i. drive shafts and couplings

#### Symptoms and faults in motorcycle transmissions and drive-line systems

- a. Clutch and coupling faults:
  - i. abnormal noises
  - ii. vibrations
  - iii. fluid leaks
  - iv. slip
  - v. judder
  - vi. grab
  - vii. failure to release
- b. Gearbox faults:
  - i. abnormal noises

- ii. vibrations
  - iii. loss of drive
  - iv. difficulty engaging or disengaging gears
  - v. automatic gear box types
  - vi. abnormal noises
  - vii. vibrations
  - viii. loss of drive
  - ix. failure to engage gear
  - x. failure to disengage gear
  - xi. leaks
  - xii. failure to operate
  - xiii. incorrect shift patterns
  - xiv. electrical and electronic faults
- c. Final drive faults:
- i. abnormal noises
  - ii. vibrations
  - iii. loss of drive
  - iv. oil leaks
  - v. failure to operate
- d. Drive-lines and couplings:
- i. abnormal noises
  - ii. vibrations
  - iii. loss of drive

#### **Faults in motorcycle transmission systems**

- a. Interpret information for diagnostic tests, vehicle and equipment specifications, use of equipment, testing procedures, test plans, fault codes and legal requirements.
- b. How to prepare equipment for use in diagnostic testing.
- c. How to conduct systematic testing and inspection of transmission system, mechanical, hydraulic, electrical and electronic systems using appropriate tools and equipment including, mullet-meters,
- d. How to carry out workshop based and road testing of vehicle and transmission system.
- e. Evaluate and interpret test results from diagnostic and/or road testing.
- f. Compare test result and values with vehicle manufacturer's specifications and settings.
- g. How to dismantle, components and systems using appropriate equipment and procedures.
- h. Assess, examine and evaluate the operation, settings, values, condition and performance of components and systems.
- i. Probable faults, malfunctions and incorrect settings.
- j. Rectification or replacement procedures.
- k. Operation of systems following diagnosis and repair to confirm operation and performance.

#### **Construction and operation of motorcycle transmission and driveline systems to include:-**

- a) clutches
- b) manual gearboxes
- c) automatics
- d) electronic control
- e) CVT (continuously variable transmission)
- f) Chain and sprocket
- g) Belt and pulley
- h) Drive shaft
- i) final drive unit
- j) hubs

**Advanced engineering principles that are related to motorcycle transmission and driveline systems**

- a) friction
- b) torque transmission
- c) material
- d) potential & kinetic energy

**Symptoms and causes of faults found in motorcycle transmission and driveline systems to include: -**

- a) clutches
- b) manual gearboxes
- c) automatics
- d) electronic control
- e) CVT (continuously variable transmission)
- f) Chain and sprocket
- g) Drive shaft
- h) final drive unit
- i) hubs

**Examine, measure and make suitable adjustments components including: -**

- a) settings
- b) input and output values
- c) voltages
- d) current consumption
- e) resistance
- f) output patterns with oscilloscope
- g) pressures
- h) condition
- i) wear and performance