Assessment Requirements

Unit LV08K – Knowledge in Diagnosis and Rectification of Light Vehicle Chassis Faults

Content:

Electrical and electronic principles of light vehicle chassis systems
a. The operation of electrical and electronic systems and components related to light vehicle chassis systems including:
   i. ECU
   ii. sensors and actuators
   iii. electrical inputs
   iv. voltages
   v. oscilloscope patterns
   vi. digital and fibre optic principles
b. The interaction between the electrical/electronic system and mechanical components of chassis systems.
c. Electronic and electrical safety procedures.

Operation of electronic ABS and EBD braking systems
a. Layout of:
   i. ABS and EBD braking systems
   ii. anti-lock braking
   iii. anti-skid control systems
   iv. warning systems
b. Operation of:
   i. hydraulic and electronic control units
   ii. wheel speed sensors
   iii. load sensors
   iv. hoses
   v. cables and connectors
   vi. hoses
   vii. hoses
   viii. ABS and EBD braking systems
   ix. ABS and EBD braking systems
   x. ABS and EBD braking systems
   xi. ABS and EBD braking systems
   xii. ABS and EBD braking systems
c. Advantage of ABS and EBD braking systems over conventional braking systems.
d. The relationship and interaction of ABS braking with other vehicle systems – traction control.

Steering geometry for light vehicle applications
a. Non-steered wheel geometry settings.
b. Front/rear wheel geometry:
   i. castor
   ii. camber
   iii. kingpin or swivel pin inclination
   iv. negative offset
   v. wheel alignment (tracking)
   vi. toe in and toe out
   vii. toe out on turns and steered wheel geometry
   viii. Ackerman principle
   ix. slip angles
   x. self-aligning torque
   xi. oversteer and understeer
   xii. neutral steer
c. The operation and layout of rear and four wheel steering.
d. The construction and operation of power assisted steering systems:
   i. hydraulic system

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Components and operation of self-levelling suspension
a. The components, construction and operation of a self-levelling suspension system.

   b. The operation of self-levelling suspension system under various conditions:
      i. self-energising
      ii. pump operated self-levelling suspension

Operation of fitting ride-controlled systems.

   a. The reasons for fitting ride controlled systems.
   b. The operation of driver controlled and ride controlled systems.

Symptoms and faults in braking systems

   a. Symptoms and faults associated with conventional braking systems, ABS, and EBD systems:
      i. mechanical
      ii. hydraulic
      iii. electrical and electronic systems
      iv. fluid leaks
      v. warning light operation
      vi. poor brake efficiency
      vii. wheel locking under braking

Diagnosis and faults in braking systems

   a. Locate and interpret information for:
      i. diagnostic tests
      ii. vehicle and equipment specifications
      iii. use of equipment
      iv. testing procedures
      v. test plans
      vi. fault codes
      vii. legal requirements

   b. Prepare equipment for use in diagnostic testing.

   c. Conduct systematic testing and inspection of:
      i. braking system
      ii. ABS
      iii. EBD
      iv. mechanical
      v. hydraulic
      vi. electrical and electronic systems

   d. Using appropriate tools and equipment including:
      i. multi-meters
      ii. oscilloscope
      iii. pressure gauges

   e. Evaluate and interpret test results from diagnostic 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, incorrect settings.

   j. Rectification or replacement procedures.
k. Operation of systems following diagnosis and repair to confirm operation and performance.

Symptoms and faults associated with steering systems
a. Symptoms and faults associated with steering systems:
   i. mechanical
   ii. hydraulic
   iii. electrical and electronic
   iv. steering boxes (rack and pinion, worm and re-circulating ball)
   v. steering arms and linkages
   vi. steering joints and bushes
   vii. idler gears
   viii. bearings
   ix. steering columns (collapsible and absorbing)
   x. power steering system

Diagnosis and faults in steering systems
a. Locate and interpret information for:
   i. diagnostic tests
   ii. vehicle and equipment specifications
   iii. use of equipment
   iv. testing procedures
   v. test plans
   vi. fault codes
   vii. legal requirements
b. How to prepare equipment for use in diagnostic testing.
c. Conduct systematic testing and inspection of:
   i. steering systems
   ii. mechanical
   iii. hydraulic
   iv. electrical and electronic systems
   v. power steering system
d. Using appropriate tools and equipment including:
   i. multi-meters
   ii. oscilloscope
   iii. pressure gauges
   iv. wheel alignment equipment
   v. steering geometry equipment
e. Evaluate and interpret test results from diagnostic 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:
   i. operation
   ii. settings
   iii. values
   iv. 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.

Symptoms and faults associated with suspension systems
a. Symptoms and faults associated with suspension systems:
   i. mechanical
   ii. hydraulic
   iii. electrical and electronic
   iv. conventional
Diagnosis and faults in suspension systems

a. Locate and interpret information for:
   i. diagnostic tests
   ii. vehicle and equipment specifications
   iii. use of equipment
   iv. testing procedures
   v. test plans
   vi. fault codes
   vii. legal requirements

b. How to prepare equipment for use in diagnostic testing.

c. How to conduct systematic testing and inspection of:
   i. suspension systems
   ii. mechanical
   iii. hydraulic
   iv. electrical and electronic systems
   v. conventional
   vi. self-levelling and ride controlled suspension systems

d. Using appropriate tools and equipment including:
   i. multi-meters
   ii. oscilloscope
   iii. pressure gauges
   iv. alignment equipment
   v. geometry equipment

d. Evaluate and interpret test results from diagnostic testing.

e. Compare test result and values with vehicle manufacturer's specifications and settings.

f. How to dismantle, components and systems using appropriate equipment and procedures.

g. Assess, examine and evaluate the operation, settings, values, condition and performance of components and systems.

h. Probable faults, malfunctions and incorrect settings.

i. Rectification or replacement procedures.

k. Operation of systems following diagnosis and repair to confirm operation and performance.

Measurements on components to include:

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