

Section 5: Motor Vehicle Technology



Purpose:

At the end of this unit candidates will be able to demonstrate a knowledge and understanding of:

- Basic vehicle construction, general procedures and background science principles.
- Engine and associated systems operating principles and functions
- Transmission systems operating principles and functions
- Steering and suspension systems operating principles and functions
- Brakes, wheels and tyres operating principles and functions
- Electrical systems operating principles and functions
- Vehicle body and paint operating principles and functions.

Summary of learning outcomes	Number of questions in the examination *
1. Basic vehicle construction, general procedures and background science principles	
1.1 Vehicle maintenance and inspections	Knowledge and application of these learning outcomes will be assessed across all questions
1.2 Vehicle Types, Construction and Introduction	
1.3 Records	
1.4 Safety Checks and Inspections	
1.5 Vehicle Recovery	
1.6 Large Goods Vehicles	
1.7 Background Science	
2. Engine and associated systems operating principles and functions	
2.1 Introduction and Operating Cycles	Knowledge and application of these learning outcomes will be assessed in one question
2.2 Engine Components	
2.3 Engine Operating Details	
2.4 Valves and Valve Gear	
2.5 Engine Layouts	
2.6 Engine Designs	
2.7 Friction and Lubrication	
2.8 Lubrication System Operation	
2.9 Oil Pumps and Filtration	
2.10 Cooling	
2.11 Components and Operation	
2.12 Antifreeze	
2.13 Air Pollution from Motor Vehicles	
2.14 Environmental Protection	
2.15 Air Supply System	
2.16 Ignition	

Summary of learning outcomes	Number of questions in the examination *
2.17 Ignition Electronics and System Operation	
2.18 Electronic Fuel Injection Systems	
2.19 Diesel Fuel Injection Systems	
2.20 Exhaust Systems	
2.21 Catalyst Systems	
2.22 Turbocharging and Supercharging	
3. Transmission systems operating principles and functions	
3.1 Purpose of the Clutch Components	
3.2 Clutch Operating Mechanisms	
3.3 Diaphragm Clutch	
3.4 Gearbox Operation	
3.5 Front and Rear Wheel Drive Gearboxes	
3.6 Torque Converter	
3.7 Automatic Transmission Components	
3.8 Propshafts	
3.9 Driveshafts	
3.10 Final Drive	
3.11 Differential Operation	
3.12 Traction Control	4. Steering and suspension systems operating principles and functions
4.1 Introduction to Steering	Knowledge and application of these learning outcomes will be assessed in one question
4.2 Steering Racks and Boxes	
4.3 Introduction to Power Steering	
4.4 Steering Geometry	
4.5 Hydraulic Power Steering	
4.6 Electric Power Steering	
4.7 Reasons for suspension	
4.8 Springs	
4.9 Dampers, Shock Absorbers	
4.10 Front Suspension Layouts	
4.11 Rear Suspension Layouts	
5.1 Brakes	
5.2 Disc, Drum and Parking Brakes	
5.3 Hydraulic Components	
5.4 Brake Servo Operation	
5.5 Braking Force Control	
5.6 Types of Wheel	
5.7 Wheel Rims and Fixings	
5.8 Antilock Brake Systems	
5.9 Tyre Construction	
5.10 Functions of the Tyre	
5.11 Wheel Balancing	

Summary of learning outcomes	Number of questions in the examination *
6. Electrical/electronic systems operating principles and functions	
6.1 Seats, Mirrors, Sunroofs and Central Locking	Knowledge and application of these learning outcomes will be assessed in one question
6.2 Security Systems	
6.3 Safety Systems	
6.4 Air Conditioning Fundamentals	
6.5 Air Conditioning Systems	
6.6 BoschESP	
6.7 On Board Diagnostics	
6.8 Oscilloscope and Traces	
6.9 Hybrid Vehicle and Safety.	
7. Vehicle body and paint operating principles and functions.	
7.1 Body Panels	Knowledge and application of these learning outcomes will be assessed in one question
7.2 Chassis	
7.3 Chassis Jigs	
7.4 Welding	
7.5 Glass	
7.6 Corrosion	
7.7 Paint	
7.8 Paint Defects	
7.9 SMART Repairs	

The examination comprises of FIVE Questions; each main Question will include 5 short answer questions. Candidates will be expected to attempt ALL questions.

Questions will comprise of the following:

Question 1. Vehicle Body and Paint Work: Materials; Material Joining; Corrosion; Corrosion prevention; Types of Paint and Paint Defects.

Question 2. Engine Technology: Construction Principles; Engine Systems such as: Cooling, Ignition, Lubrication, Fuel, Intake and Exhaust).

Question 3. Chassis Technology: Steering, Suspension, Brakes, Wheels and Tyres.

Question 4. Transmission Technology: Clutches/Couplings; Gearboxes (manual and automatic), Final Drive, and Traction Control

Question 5. Electrical/Electronic Technology and Diagnostics: Central Locking, electric windows, seats, sunroofs etc.; Safety Systems; Alarms and Security systems; Hybrid Vehicles, Diagnostics including: Oscilloscopes and On Board Diagnostics (OBD).