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AUTOMOTIVE TECHNOLOGY LEVEL 6

ENG/OS/AUT/CR/8/6

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Service Vehicle Electrical Systems

November/December 2025

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TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)

WRITTEN ASSESSMENT

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TIME: 3 HOURS

Date: 21.11.2025 10:47 AM

INSTRUCTIONS TO CANDIDATE

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1. This paper consists of **TWO** sections: **A** and **B**. Date: 21.11.2025 10:47 AM
2. Answer **ALL** questions in section A and **ANY THREE (3)** questions in section B.
3. ~~Printed By: Technical And Vocational College Date: 21.11.2025 10:47 AM~~ Marks for each question are indicated in the brackets.
4. ~~Printed By: Technical And Vocational College Date: 21.11.2025 10:47 AM~~ Candidates are provided with a separate answer booklet.
5. Do not write on the question paper.

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This paper consists of FOUR (4) printed pages
Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A: (40 MARKS)

Answer ALL questions in this section

1. Modern vehicle engines monitor and control various functions for efficient performance. List FOUR sensors commonly fitted in a vehicle engine. (4 Marks)
2. Although mechanical ignition systems were widely used in older vehicles, they have several limitations compared to modern electronic systems. Outline FOUR disadvantages of mechanical ignition systems. (4 Marks)
3. The Engine Control Unit (ECU) plays a key role in engine operations. When a fault is recognized, it performs specific corrective functions. List functions performed by the ECU when a fault is recognized. (3 Marks)
4. To ensure reliable performance and a longer service life, vehicle batteries must be routinely inspected and maintained. List FOUR checks that are carried out on batteries. (4 Marks)
5. An automotive generator must meet certain performance and design conditions to operate efficiently in a vehicle's electrical system. Outline FOUR basic requirements of an automotive generator. (4 Marks)
6. Over time, different types of generators have been used in vehicles to supply electrical power. Name the TWO types of generators that have been used in vehicles. (2 Marks)
7. In a pre-engaged type starter motor, the solenoid is a key component that aids in both electrical and mechanical operations. Give TWO functions of a solenoid engaged type starter. (2 Marks)
8. Modern vehicles are equipped with central locking systems that improve convenience and security. Major categories of central locking systems. (2 Marks)
9. Electronic ignition systems are prone to certain faults that can affect engine performance. State THREE faults that may occur in an electronic ignition system. (3 Marks)
10. In a generator, the pulley and belt mechanism transfers engine power to rotate an internal component.
 - a) Name the part that is driven by the pulley and belt in the alternator. (2 Marks)
 - b) Name the component that feeds the battery with current in a vehicle. (2 Marks)

11. When diagnosing a faulty electronic ignition system, several checks must be carried out to identify the problem. State any FOUR checks that should be done on a faulty electronic ignition system. (4 Marks)

12. An electronic ignition system is made up of several key components, each performing a specific function to ensure proper ignition and engine performance. List down FOUR components of the electronic ignition. (4 Marks)

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SECTION B: (60 MARKS)

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Answer ANY THREE questions

13. To assess the condition and performance of a starter motor, various diagnostic procedures are performed.

a) Name FIVE measuring tools and equipment used in testing the starter motor. (5 Marks)

b) Explain FOUR tests that are carried out on a starter motor. (8 Marks)

Printed By **c) h**ow a vehicle's charging system requires careful attention to safety and Date:
21.11.2025 10:47 AM component protection. Highlight SEVEN precautions that should be observed when carrying out charging system service. (7 Marks)

14. A motor vehicle is equipped with several systems that support operation, safety, and comfort.

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a) Explain the functions of SIX electrical systems that are found in a vehicle. (12 Marks)

b) Explain the function of the following system as used in vehicles. (8 Marks)

i) locking systems

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ii) Immobiliser systems

iii) Alarm systems

iv) Can bus

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15.

a) A conventional ignition system is made up of several components that work together to generate and deliver the spark required for combustion.

i) Highlight FIVE components of a conventional ignition system. (5 Marks)

ii) Explain the function of the components in i) above. (5 Marks)

b) Proper charging of a lead-acid battery on the bench is essential to restore its capacity and prolong its service life. Outline the steps involved in carrying out bench charging of a lead-acid battery. (10 Marks)

16.

a) Gauges and warning lamps help the driver to monitor the condition of various systems of the vehicle.

i) Outline FIVE types of gauges used in a vehicle. (5 Marks)

ii) Highlight the functions of the gauges mentioned in i) above. (5 Marks)

b) Vehicles are equipped with various systems that enhance driver visibility and safety during adverse weather conditions. State one function of each of the following windshield wiper system in a vehicle.

i) Windshield wiper switch

ii) Wiper motor assembly

iii) Wiper linkage

iv) Wiper blade

v) Windshield wiper pump

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