



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

AUTOMOTIVE ELECTRICS AND ELECTRONICS

**MODULE: Wiring, Lighting and Auxilliary
Systems**

**PAPER NO: 306/22/M03
306/25/M03**

DURATION: 3 Hours

JUNE 2026 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

- 1. Section A: Answer all questions – (40 marks).**
- 2. Section B: Answer any three (3) questions – (60 marks).**

SECTION A

QUESTION 1

- a) State four (4) major components of a basic circuit. (4 marks)
- b) Identify four (4) causes of voltage drop in a circuit. (4 marks)
- c) Draw standard circuit symbols for the following:
 - i) Resistor (1 mark)
 - ii) Fuse (1 mark)
 - iii) Motor (1 mark)
 - iv) Light bulb (1 mark)
 - v) 12V battery (1 mark)
- d) Give three (3) circuit protection devices commonly used on a motor vehicle. (3 marks)
- e) Draw a diagram to show two (2) 12V batteries connected in parallel. (3 marks)
- f) State the unit for measuring battery capacity. (1 mark)

QUESTION 2

- a) A headlamp bulb working on 12V battery takes a current of 3A. calculate the resistance of the bulb filament. (3 marks)
- b) Explain the term insulated earth return system. (2 marks)
- c) State three (3) characteristics of a series circuit. (3 marks)
- d) Explain the purpose of a relay in a circuit. (2 marks)
- e) List two (2) advantages of using LED stop lamps as compared to the filament type. (2 marks)
- f) State the recommended bulb power ratings for the following:
 - i) Instrument panel (1 mark)
 - ii) Park light (1 mark)
 - iii) Indicator (1 mark)
 - iv) High beam headlight (1 mark)
 - v) Reverse light (1 mark)

- g) Identify three (3) common causes of circuit faults. (3 marks)

SECTION B

Answer any four (4) questions.

QUESTION 3

- a) Identify three (3) systems that require brake light signal for operation. (3 marks)
- b) State one (1) cause of each of the following halogen bulb failure:
- i) Grey colour (1 mark)
 - ii) White / cloudy colour (1 mark)
 - iii) Broken filament (1 mark)
 - iv) Blistered glass (1 mark)
- c) Briefly describe the procedure for adjusting headlamps using the wall method. (8 marks)

QUESTION 4

- a) Identify five (5) routine battery services that can be performed on a lead acid battery. (5 marks)
- b) Explain the procedure for testing the battery state of charge using a digital voltmeter. (6 marks)
- c) State the purpose of performing the following battery tests:
- i) Hydrometer test (1 mark)
 - ii) High rate discharge test (1 mark)
 - iii) 3 minute fast charge test (1 mark)
 - iv) Electronic conductance test (1 mark)

QUESTION 5

- a) State two (2) possible cause of each of the following power window, problems.
- i) Power windows fail to operate (2 marks)
 - ii) One power window in operative (2 marks)
 - iii) Only one power window can be operated from the master switch (2 marks)
- b) List three (3) techniques used for suppressing radio interference. (3 marks)
- c) Name four types of electronic displays that can be used on motor vehicle instrument cluster. (4 marks)
- d) Give two (2) major parts of a navigation system. (2 marks)

QUESTION 6

- a) Explain the purpose of the following air conditioning components:
- i) Compressor (2 marks)
 - ii) Condenser (2 marks)
 - iii) Evaporator (2 marks)
 - iv) Drier (2 marks)
 - v) Pressure switch (2 marks)
- b) State colour code of the airbag loom. (2 marks)
- c) State three (3) stages of cruise control system. (3 marks)

QUESTION 7

- a) State the purpose of the windshield wipers. (1 mark)
- b) State five (5) major components of the wiper system. (5 marks)
- c) Identify three (3) causes of noisy wiper blades. (3 marks)
- d) Describe any four (4) major components of an alarm system. (4 marks)
- e) Name two (2) components / systems that are disabled when the immobiliser is armed. (2 marks)

...../pm