TEVETA
Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN AUTOMOTIVE ENGINEERING

LEVEL 6 YEAR I EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATION

SITTING: JULY/AUGUST 2025

SUBJECT: BRAKING SYSTEM

TIME: THREE (3) HRS TOTAL MARKS: 100

PASS MARK 50

INSTRUCTIONS TO CANDIDATE

1. Write your Examination number and National Registration Card (NRC) number on the answer booklet provided. Ensure you append your signature in the space provided on the answer booklet.
2. Write the ANSWER SCRIPT SERIAL NUMBER on the examination register and on the entry slip provided.
3. This paper consists of EIGHT (8) questions.
4. Answer FIVE (5) questions. Question ONE (1) is compulsory and any other FOUR (4) questions.
5. All questions carry equal marks.
6. Cell phones and programmable calculators are not allowed in the examination room.

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QUESTION 1 - COMPULSORY

a) Describe how a hydraulic braking system performs the following functions:

(i) Slowing down the vehicle (4 Marks)

(ii) Stopping the vehicle (4 Marks)

(iii) Keeping the vehicle stationary (4 Marks)

b) Explain the primary difference between hydraulic and pneumatic braking systems, focusing on their operating principles. (8 Marks)

Total (20 Marks)

QUESTION 2

Describe the following key properties of hydraulic brake fluid:

a) Hygroscopic nature (4 Marks)

b) Corrosion resistance (4 Marks)

c) Non compressible (4 Marks)

d) High boiling point (4 Marks)

e) Lubricity (4 Marks)

Total (20 Marks)

QUESTION 3

a) With the aid of labelled diagrams, describe the construction of the following types of brake assemblies:

(i) Disc brakes (5 Marks)

(ii) Drum brakes (5 Marks)

b) Describe the operation and design of the following types of emergency (parking) brakes.

(i) Stick lever-type hand brake (5 Marks)

(ii) Centre console-mounted hand brake (5 Marks)

Total (20 Marks)

QUESTION 4

a) State three (3) advantages of a floating calliper compared to a fixed calliper. (6 Marks)

b) Identify two (2) common types of brake rotors. (4 Marks)

c) List five (5) disadvantages associated with a mechanical braking system. (10 Marks)

Total (20 Marks)

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QUESTION 5

a) Explain the function of a wheel brake cylinder. (2 Marks)

b) Identify three (3) harmful factors that negatively affect hydraulic brake fluid. (3 Marks)

c) Describe the process by which the wheel cylinder transforms hydraulic pressure into mechanical force. (5 Marks)

d) Outline the step-by-step procedure for bleeding a brake system to remove air from the hydraulic lines. (10 Marks)

Total (20 Marks)

QUESTION 6

a) Explain the function of each of the following components in a pneumatic braking system:

(i) Brake chamber (2 Marks)

(ii) Brake expander (2 Marks)

(iii) Pedal control valve (2 Marks)

(iv) Air gauge (2 Marks)

(v) Unloader valve (2 Marks)

b) With the help of a labelled diagram, describe the general working principle of a foot valve in a pneumatic brake system. (10 Marks)

Total (20 Marks)

QUESTION 7

a) Describe the operational difference between a governor valve and an unloader valve, focusing on their principles of operation. (10 Marks)

b) Describe the sequence of air pressure flow from the air compressor to the actuators in a pneumatic braking system. (10 Marks)

Total (20 Marks)

QUESTION 8

a) Draw a single-acting brake chamber and clearly label all its components. (6 Marks)

b) Describe the process by which the emergency brake function is activated in a pneumatic braking system. (10 Marks)

c) Explain two (2) key functions of the Electronic Control Unit (ECU) in a traction control system. (4 Marks)

Total (20 Marks)