

2503/105
VEHICLE TECHNOLOGY
AND PRACTICE
Oct./ Nov. 2019
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN AUTOMOTIVE ENGINEERING
MODULE I

VEHICLE TECHNOLOGY AND PRACTICE

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following:

- answer booklet;
- drawing instruments.

This paper consists of TWO sections; A and B.

Answer a total of FIVE questions taking at least TWO questions from each section.

All questions carry equal marks.

Maximum marks for each part of a question are as indicated.

Candidates should answer the questions in English.

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This paper consists of 4 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A

Answer at least TWO questions from this section.

1. (a) (i) Describe three classes of fire. (9 marks)
- (ii) State an extinguishing agent for each class of fire in (a)(i) above. (9 marks)
- (b) Using a labeled sketch, explain the operation of the transfer gearbox used in the four-wheel drive system. (11 marks)
2. (a) State two advantages of the four-wheel steering system. (2 marks)
- (b) Explain the following terms as applies to the steering system: (4 marks)
- (i) camber angle;
- (ii) kingpin inclination.
- (c) (i) State two functions of the steering system. (4 marks)
- (ii) With the aid of a diagram, explain the operation of the power assisted steering system. (14 marks)
3. (a) State four advantages of disc brakes. (4 marks)
- (b) (i) Explain the term "brake fade" as applied to the braking system. (3 marks)
- (ii) State the cause and effect of brake fade on the braking system. (3 marks)
- (c) With the aid of a labelled sketch, explain the operation of the continuous flow brake servo unit. *BRAKE -> 2nd cylinder -> ports -> 1st cylinder* (13 marks)
4. (a) (i) State two functions a tyre. (8 marks)
- (ii) Explain the tyre markings 195/65 R 15 91 H.
- (b) Using a sketch, explain the operations of the hydropneumatic suspension system. (12 marks)

BRAKE
PEDAL →

SECTION B

Answer at least TWO questions from this section.

5. (a) State two causes of each of the following faults of the hydraulic drum brake:
- (i) pedal travel excessive; *Less brake fluid in the system*
 - (ii) pedal feels hard; *Leakage in the system*
 - (iii) brakes binding on release. *Air in the system / fluid. Excess fluid in the system*
- worn out pads* (6 marks)
Weak or return springs
- (b) A vehicle has its tandem master cylinder seals leaking. Describe the procedure of overhauling the unit. (14 marks)
6. (a) State two:
- (i) effects of worn shock absorbers. *Discorn tone*
 - (ii) causes of each of the following faults of the suspension system: *Noisy*
- (I) noisy operations; *loose*
 - (II) excessive pitching. *wear and tear suspension*
- 10538* (6 marks)
- (b) A vehicle has been brought to the workshop with a wishbone type suspension system. Describe the procedure of servicing the system. (14 marks)
7. (a) State two causes of each of the following faults on the final drive:
- (i) noisy operation;
 - (ii) overheating.
- (4 marks)
- (b) Describe the procedure of overhauling a final drive of a vehicle. Assume the unit is on the work bench. (16 marks)

8. (a) State **two** causes of each of the following steering problems:

- (i) road wander;
- (ii) high steering effort in one direction;
- (iii) lost of motion at the steering wheels.

(6 marks)

(b) Describe the procedure followed when performing each of the following wheel alignment operations:

- (i) preliminary inspection;
- (ii) camber measurement and adjustment;
- (iii) toe measurement and adjustment.

(14 marks)

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