

1503/105

VEHICLE TECHNOLOGY, BODYWORK  
AND WORKSHOP TECHNOLOGY

June/July 2020

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN MOTOR VEHICLE ENGINEERING

MODULE I

VEHICLE TECHNOLOGY, BODYWORK AND  
WORKSHOP TECHNOLOGY

3 hours

#### INSTRUCTIONS TO CANDIDATES

*You should have the following for this examination:*

*Answer booklet;*

*Drawing instruments.*

*This paper consists of EIGHT questions in THREE sections; A, B and C.*

*Answer a total of FIVE questions taking at least TWO questions from section A, ONE question from each of the sections B and C.*

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

*Candidates should answer the questions in English.*

**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: VEHICLE TECHNOLOGY

*Answer at least TWO questions from this section.*

1. (a) (i) State **three** functions of tyres in a vehicle.  
(ii) Interpret the marking '205/70R15' on a tyre side wall. (7 marks)
- (b) With the aid of a sketch, explain the operation of the hydroelastic suspension unit. (13 marks)
2. (a) Define the term 'brake fade' and state its cause. (2 marks)
- (b) (i) State **two** advantages of auxiliary brakes on heavy commercial vehicles.  
(ii) With the aid of a sketch, explain the operation of a hydraulic retarder on heavy commercial vehicles. (18 marks)
3. (a) Sketch the layout of the four-wheel drive system of a vehicle. (4 marks)
- (b) (i) State **two** functions of the torque converter.  
(ii) Using a labelled diagram, explain the operation of the torque converter. (16 marks)
4. (a) State **two**:  
(i) functions of steering system;  
(ii) conditions a power steering system should satisfy;  
(iii) advantages of a power assisted steering system. (6 marks)
- (b) With the aid of a sketch, explain the operation of a power assisted steering system. (14 marks)

## SECTION B: BODY WORK

Answer at least **ONE** question from this section.

5. (a) State:
- (i) **two** types of adhesives;
  - (ii) **four** properties of upholstery materials. (6 marks)
- (b) State **three** types of chassis frame section and a characteristic of each. (6 marks)
- (c) Sketch the following types of vehicle body designs:
- (i) hatchback;
  - (ii) estate car. (8 marks)
6. (a) (i) State **two** functions of spray painting.
- (ii) Explain the **four** constituents of automotive paint. (10 marks)
- (b) (i) State the function of the following panel beating materials:
- ✓ (I) body filler
  - (II) surfacer;
  - ✓ (III) wet sand paper
  - ✓ (IV) primer.
- (ii) Sketch and state the function of the following panel beating tools:
- (I) surface spoon;
  - (II) curved dolly or common block. (10 marks)

## SECTION C: WORKSHOP TECHNOLOGY

Answer at least **ONE** question from this section.

7. (a) Explain the following classes of fire stating the extinguisher used in each case:
- (i) class A;
  - (ii) class B.
- (6 marks)
- (b) Explain the following properties of engineering materials and state an example of a material possessing the property:
- (i) ductility;
  - (ii) toughness.
- (4 marks)
- (c) Illustrate and explain the following types of welding methods:
- (i) spot welding;
  - (ii) seam welding.
- (10 marks)
8. (a) Illustrate the following lathe operations:
- (i) facing;
  - (ii) parting off.
- (4 marks)
- (b) Define and state an example of each of the following classes of plastics
- (i) thermosetting;
  - (ii) thermoplastic.
- (6 marks)
- (c) (i) Define soldering.
- (ii) State **three** reasons of using fluxes when soldering.
- (4 marks)
- (d) Illustrate a reading of 18.67 mm on a micrometer with an accuracy of 0.01.
- (6 marks)

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