

1503/105

VEHICLE TECHNOLOGY, BODYWORK
AND WORKSHOP TECHNOLOGY

Oct./Nov. 2022

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 section B, ONE question from section C and one other question from any sections.

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 **two** disadvantages and **two** advantages of an exhaust retarder.
- (ii) Explain the following brake system terms:
- I. servo action;
 - II. bleeding. (6 marks)
- (b) With the aid of a diagram, explain the operation of an exhaust brake retarder. (14 marks)
2. (a) Using sketches, explain the following steering terms:
- (i) over-steer;
 - (ii) castor angle;
 - (iii) toe-in. (6 marks)
- (b) With the aid of a diagram, explain the operation of a power assisted steering system. (14 marks)
3. (a) State:
- (i) **four** functions of a leaf spring suspension;
 - (ii) **two** safety precautions to observe when working on suspension systems. (6 marks)
- (b) Using a labelled diagram, explain the operation of a hydro-pneumatic suspension in terms of roll, pitch and bounce. (14 marks)
4. (a) Illustrate the following axle arrangements:
- (i) semi floating;
 - (ii) three-quarter floating;
 - (iii) fully floating. (6 marks)
- (b) With the aid of a diagram, explain the operation of a single plate diaphragm spring clutch. (14 marks)

SECTION B: WORKSHOP TECHNOLOGY

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

5. (a) Explain two:
- (i) causes of accidents in workshops;
 - (ii) classes of fires and the material involved;
 - (iii) factors to consider in laying out an automotive workshop. (6 marks)
- (b) Define each of the following material properties and name **one** metal possessing the property:
- (i) ductility;
 - (ii) hardness;
 - (iii) malleability. (6 marks)
- (c) Sketch a blast furnace and describe the process of extracting iron. (8 marks)
6. (a) (i) Illustrate a reading of 22.24 mm on a vernier caliper. (3 marks)
- (ii) Illustrate an application of a surface gauge in combination with angle plate and surface plate in marking out. (5 marks)
- (b) Explain the steps to follow in joining two thin plates by soldering using a hatchet. (6 marks)
- (c) State the steps to follow in facing a short round mild steel bar. (6 marks)

SECTION C: BODY WORK

Answer at least ONE question from this section.

7. (a) Illustrate a saloon car body and label the following parts:
- (i) bonnet;
 - (ii) windscreen;
 - (iii) B-post;
 - (iv) door sill;
 - (v) quarter panel;
 - (vi) front wing. (9 marks)
- (b) (i) State and illustrate three types of chassis frame sections.
(ii) State **three** types of forces acting on a chassis frame and their causes.
(iii) State **two** functions of the chassis frame in a vehicle. (11 marks)
8. (a) (i) Illustrate the following upholstery tools and name **one** use of each:
- I. ripping chisel;
 - II. webbing pliers.
- (ii) State **two** paint constituents and their function.
(iii) State a precaution to observe when spray painting panels. (11 marks)
- (b) Sketch the following body work tools and state one application of each:
- (i) dinging spoon;
 - (ii) utility pick hammer;
 - (iii) double ended round dolly. (9 marks)

THIS IS THE LAST PRINTED PAGE.