

1503/105

**VEHICLE TECHNOLOGY, BODYWORK
AND WORKSHOP TECHNOLOGY**

June/July 2018

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN AUTOMOTIVE 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 **THREE** sections; **A**, **B** and **C**.*

*Answer **FIVE** questions taking at least **TWO** questions from section **A**, at least **ONE** question from section **B** and at least **ONE** question from section **C**.*

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

Candidates should answer all questions in English.

This paper consists of 3 printed pages.

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

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Turn over

SECTION A: VEHICLE TECHNOLOGY

Answer at least **TWO** questions from this section.

1. ✓ (a) State the **three** main components of an epicyclic gear train. (3 marks)
- (b) State **three** advantages of using the baulk ring synchronizer in a gear box. (3 marks)
- (c) With the aid of diagram, explain the operation of a constant mesh gearbox. (14 marks)
2. (a) State the Ackermann steering principle. (1 mark)
- (b) (i) State the purpose of caster angle. (5 marks)
- (ii) Using a sketch, illustrate the caster angle as applied to the vehicle steering geometry. (14 marks)
3. (a) State **two** disadvantages of disc brake over drum brakes. (2 marks)
- (b) With the aid of a diagram, explain the operation of a hydraulic retarder. (18 marks)
4. (a) State the difference between cross-ply and radial-ply tyres. (2 marks)
- (b) Explain the marking 205/50 R15 91V on the sidewall of a tyre. (5 marks)
- (c) With the aid of a diagram, explain the operation of hydragas suspension unit. (13 marks)

WORKSHOP TECHNOLOGY

SECTION B: VEHICLE BODYWORK

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

5. ✓ (a) State **three** causes of accidents in a workshop. (3 marks)
- (b) Describe the following properties of metals:
- (i) hardness;
- (ii) ductility;
- (iii) brittleness;
- (iv) malleability. (4 marks)
- (c) Describe how Holger Nielsen method of first aid is carried out. (5 marks)
- (d) Explain how cast iron is manufactured. (8 marks)

6.

(a) State the applications of the following parts of the lathe:

- (i) saddle;
- (ii) cross-slide;
- (iii) compound slide;
- (iv) tail stock.

30-40 100-110
40-50 80-90 40
60-

(4 marks)

(b) Describe procedure to carry out each of the following processes:

- (i) riveting;
- (ii) left hand gas welding technique;
- (iii) brazing.

(16 marks)

BODY WORK

SECTION C : WORKSHOP TECHNOLOGY

Answer at least ONE question from this section.

7.

(a) State two functions of the vehicle chassis.

(2 marks)

(b) Explain three types of frame sections.

(6 marks)

(c) Using sketches, explain three types of forces acting on chassis frame. State an affect of each.

(12 marks)

8.

(a) Describe the hammering technique applied on vehicle body panel shaping.

(4 marks)

(b) Describe three types of paint.

(6 marks)

(c) Explain the following spray painting defects:

- (i) blistering;
- (ii) cob webbing ;
- (iii) blushing;
- (iv) bridging;
- (v) blooming.

Cold
wet h

Channel

(10 marks)

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channel



Tubular



Boxe