

Name: \_\_\_\_\_ Index No. \_\_\_\_\_

1503/105  
VEHICLE TECHNOLOGY, BODYWORK AND  
WORKSHOP TECHNOLOGY  
Oct./ Nov. 2014  
Time: 3 hours

Candidate's Signature: \_\_\_\_\_

Date: \_\_\_\_\_



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**CRAFT CERTIFICATE IN AUTOMOTIVE ENGINEERING  
MODULE I**

VEHICLE TECHNOLOGY, BODYWORK AND WORKSHOP TECHNOLOGY

3 hours

**INSTRUCTIONS TO CANDIDATES**

*Write your name and index number in the spaces provided above.*

*Sign and write the date of examination in the spaces provided above.*

*You should have drawing instruments for this examinations.*

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

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

*Marks for each part of a question are as shown.*

*Answers to the questions must be written in the spaces provided in this booklet.*

*Candidates should answer the questions in English.*

**For Examiner's Use Only**

Section	Question	Maximum Score	Candidate's Score
A		20	
		20	
B		20	
C		20	
A B or C		20	
TOTAL SCORE			

**This paper consists of 16 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) With the aid of sketches, explain the terms below:
- (i) camber angle;
  - (ii) king pin inclination;
  - (iii) caster angle.
- (6 marks)
- (b) Using a labelled diagram, explain the operation of a power assisted steering system. (14 marks)
2. (a) (i) State **two** functions of a suspension system.
- (ii) State **three** functions of a tyre. (5 marks)
- (b) With the aid of a labelled diagram, explain the operation of a hydro-pneumatic suspension system. (15 marks)
3. (a) State:
- (i) **two** advantages of disc brakes over drum brakes;
  - (ii) **two** advantages and **one** disadvantage of a twin leading shoe brake arrangement over a leading and trailing shoe brake. (5 marks)
- (b) With the aid of a diagram, explain the operation of a vacuum servo unit used in brakes. (15 marks)
4. (a) State **four** requirements that a modern universal joint should satisfy. (4 marks)
- (b) Using a labelled diagram, explain the operation of a final drive assembly used in conventional cars. (16 marks)

## SECTION B: BODYWORK

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

5. (a) (i) Sketch an estate car and label the following parts:
- (I) front bumper;
  - (II) B-post;
  - (III) door sill;
  - (IV) cant sill;
  - (V) front wing.
- (ii) State **three** qualities of upholstery material used in a car. (10 marks)
- (b) (i) State **three** advantages of using plastics in vehicle bodies.
- (ii) State **one** function of each of the following tools:
- (I) body spoons;
  - (II) body files;
  - (III) hardwood blocks.
- (10 marks)
6. (a) (i) State **two** safety precautions to be observed when working with car paints.
- (ii) Sketch a spray gun and explain its operation. (10 marks)
- (b) (i) Describe **two** types of paints.
- (ii) Describe the following fibre laminate faults and give one cause in each case:
- (I) pin holing;
  - (II) leaching;
  - (III) star cracking.
- (10 marks)

## SECTION C: WORKSHOP TECHNOLOGY

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

7. (a) (i) State **four** classes of fires and give an example of the material involved in each of the case. (6 marks)
- (ii) State an appropriate fire extinguisher for each class of fire above. (6 marks)
- (b) (i) What does "M 16 x 1.5" as applies to thread forms mean? (5 marks)
- (ii) Illustrate the details of an isometric screw thread. (5 marks)
- (c) (i) Sketch a lathe turning tool and show the following: (5 marks)
- (I) clearance angle;
  - (II) rake angle;
  - (III) wedge angle. (4 marks)
- (ii) Sketch an external micrometer and label the parts. (4 marks)
8. (a) Explain the meaning of the following forging operations: (5 marks)
- (i) drop forging;
  - (ii) stretching;
  - (iii) upsetting;
  - (iv) parting off;
  - (v) stepping. (2 marks)
- (b) (i) Differentiate soft soldering from hard soldering. (4 marks)
- (ii) Describe the stages of producing a soldered joint. (4 marks)
- (c) (i) Explain **four** operations that are carried out on a lathe machine. (9 marks)
- (ii) Explain **three** methods of holding work pieces on a lathe machine. (9 marks)