Name: _____ Index No: _____/_____

2103/305
ENGINES AND AUTO ELECTRICS
(THEORY AND PRACTICE)
Oct./ Nov. 2013
Time: 3 hours

Candidate's Signature: _____

Date: _____

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN AUTOMOTIVE ENGINEERING

ENGINES AND AUTO ELECTRICS
(THEORY AND PRACTICE)

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 examination.*
*This paper consists of **FOUR** sections; **A**, **B**, **C** and **D**.*
*Answer **FIVE** questions in all taking at least **ONE** question from each section.*
All questions carry equal marks. Write your answers in the spaces provided in the question paper.
Maximum marks for each part of a question are as indicated.
Candidates should answer the questions in English.

For Examiner's Use Only

Section	Question	Maximum marks	Candidate's Score
A	1	20	
	2	20	
B	3	20	
	4	20	
C	5	20	
	6	20	
D	7	20	
	8	20	
		Total Score	

This paper consists of 20 printed pages.

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

Turn over

SECTION A

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

1. (a) Explain **two** functions of a governor in a compression ignition engine. (4 marks)

   (b) With the aid of a sketch, explain the operation of a hydraulic governor used in an engine. (16 marks)

2. (a) State **two** advantages and **two** disadvantages of a wankel engine over the reciprocating piston type. (4 marks)

   (b) With the aid of a sketch, explain the operation of a wankel engine. (16 marks)

SECTION B

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

3. Describe a procedure for carrying out the following on a D.P.A fuel injection pump:

   (a) Setting maximum fuel delivery; (6 marks)
   (b) Adjusting automatic advance; (6 marks)
   (c) Checking internal timing. (8 marks)

4. Describe a procedure for carrying out a chassis dynamometer test on a vehicle. (20 marks)

SECTION C

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

5. (a) State any **two** advantages of a transistor regulator charging system. (2 marks)

   (b) With the aid of a circuit diagram, explain the operation of a transistor regulator charging system. (18 marks)

6. (a) Illustrate inboard and outboard starter motor drives. (4 marks)

   (b) With the aid of a circuit diagram, explain the operation of a sliding armature starter motor. (16 marks)

SECTION D

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

7. Describe a procedure for overhauling an alternator used in a vehicle charging system. Assume the unit is on the bench. (20 marks)

8. Describe a procedure for carrying out the following on a vehicle:

   (a) diagnosing faults on the headlamp circuit. (8 marks)

   (b) setting headlamp beam using a beam setter. (12 marks)