

2503/205

ENGINE TECHNOLOGY AND  
BODYWORK

Oct. / Nov. 2021

Time: 3 Hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN AUTOMOTIVE ENGINEERING

MODULE II

ENGINE TECHNOLOGY AND BODYWORK

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 a total of **FIVE** questions as follows:*

***Question 1** in section A is compulsory*

*Any **TWO** questions from section B;*

*Any **TWO** questions from section C.*

*All questions carry equal marks.*

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

*Candidates should answer the 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.

## SECTION A: BODY WORK

*This section is compulsory.*

1. (a) (i) State **two** types of chassis construction. *conventional / semi-conventional*
- (ii) Describe the following car body parts:
- (I) roof; *upper exterior part that protects against rain*
  - (II) C-post; *front side rail holding windscreen*
  - (III) quarter panel; *front side exterior part between hood*
  - (IV) front fender. *exterior part in car near side door boot / rear door*
- (6 marks)
- (b) (i) Explain the function of the following vehicle repair tools:
- (I) sand bags; *re-alignment*
  - (II) hallowing hammer. *dotting for smoothing & stretching*
- (ii) Describe the following faults on car panel paint and state one cause for each fault:
- (I) pin holing; *formation of tiny holes in paint coat*
  - (II) orange peel. *peeling of paint coat from painted surface*
- (6 marks)
- (c) Describe a procedure to follow in the preparation of a damaged panel ready for spray painting. (8 marks)

## SECTION B: ENGINE TECHNOLOGY

*Answer at least TWO questions from this section.*

2. (a) State **two** functions of a governor used in diesel engines. (2 marks)
- (b) Explain the meaning of the following terms as used in the distributor type fuel injection pump (DPA):
- (I) transfer pressure;
  - (II) metering pressure.
- (4 marks)
- (c) With the aid of a diagram, explain the operation of the hydraulic governor used in the distributor type fuel injection pump. (14 marks)



3. (a) Explain, using a labelled diagram, the operation of the bellows type thermostat used in the engine cooling system. (10 marks)
- (b) With the aid of a sketch, explain the operation of a gear type oil pump. (10 marks)
4. (a) State **two** advantages and **two** disadvantages of the rotary engine. (4 marks)
- (b) Using a labelled diagram, explain the operation of the rotary diesel (cottage leaf) engine. (16 marks)

### SECTION B: ENGINE PRACTICE

*Answer at least TWO questions from this section.*

5. An engine has worn cylinder bores which require reboring. Explain the procedure for carrying out the exercise. (20 marks)
6. (a) (i) Describe a procedure to be followed when stopping a turbo charged engine. 3
- (ii) State **three** symptoms of worn seals of a turbocharger. (6 marks)
- (b) A vehicle has been brought to the workshop with a faulty turbocharger. Describe the procedure for overhauling the unit. (14 marks)
7. (a) State **two** possible causes of the following diesel engine faults: 6
- (i) engine idles roughly with abnormal noise and smoke;
- (ii) engine emits excessive black smoke;
- (iii) engine emits white or blue smoke. (6 marks)
- (b) A vehicle has a faulty in-line fuel injection pump. Describe the procedure of phasing and calibrating the pump. (14 marks)

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