

1503/205  
ENGINES AND AUTOELECTRICS  
Oct./Nov. 2022  
Time 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL  
CRAFT CERTIFICATE IN AUTOMOTIVE ENGINEERING  
MODULE II

ENGINES AND AUTOELECTRICS

3 hours

**INSTRUCTIONS TO CANDIDATES**

*You should have drawing instruments for this examination.*

*This paper consists of TWO sections; A and B.*

*Answer FIVE questions taking at least TWO questions from either section, in the spaces provided in this question paper.*

*All questions carry equal marks.*

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

*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: ENGINE TECHNOLOGY

*Answer at least TWO questions from this section.*

1. (a) State **two** advantages and **two** disadvantages of the gas turbine engine. (4 marks)
- (b) With the aid of a diagram, explain the operation of the gas turbine engine. (16 marks)
2. (a) (i) State **three** oil additives  
(ii) Explain one function of each oil additive in 2(a)(i) above. (6 marks)
- (b) Using a well labelled diagram, explain the operation of the wet sump lubrication system. (14 marks)
3. (a) Explain **three** effects of engine overheating. (6 marks)
- (b) State **two** advantages and **two** disadvantages of water being used as an engine coolant. (4 marks)
- (c) With the aid of a diagram, explain the operation of the bellows type thermostat. (10 marks)
4. (a) State **two** functions of engine governors. (2 marks)
- (b) (i) Explain why a pneumatic governor is referred to as "an all speed governor."  
(ii) With the aid of a diagram, explain the operation of the pneumatic governor. (18 marks)

## SECTION B: AUTO ELECTRICS

*Answer at least TWO questions from this section.*

5. (a) State **three** functions of the air conditioning system used in the modern car. (3 marks)
- (b) Using the layout of the vehicle air conditioning system, explain its operation. (17 marks)
6. (a) State **three** auxiliary equipments in a car and their functions. (6 marks)
- (b) Sketch and label the thermal type fuel gauge. (14 marks)

7. (a) State **three** advantages of the electronic ignition system. (3 marks)
- (b) (i) State the **three** main types of pulse generators used in the electronic ignition system.
- (ii) With the aid of a diagram, explain the operation of the transistor ignition system. (17 marks)
8. (a) State **four** advantages of the electronic diesel fuel injection system used in a vehicle. (3 marks)
- (b) With the aid of a sketch, explain the operation of the common rail diesel fuel injection system. (17 marks)

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