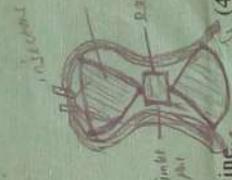


Advantages

- Engine balancing and vibration problem are easily overcome
- low engine noise due to fewer lubrication parts
- simple pump to lubricate



SECTION A: ENGINE TECHNOLOGY

Answer at least TWO questions in this section.

- (a) State two advantages and two disadvantages of turbo charging petrol engines. (4 marks)
- (b) With the aid of diagram, explain the operation of a rotary diesel. (16 marks)

- (a) State two advantages and two disadvantages of turbo charging petrol engines. (4 marks)

- Increase exhaust gas engine
- Require precise lubrication & high speed running high temperature.
- Must be made of materials that withstand high temperature.

Explain why engines fitted with turbochargers

Compressed air to the engine intake
 which increases pressure & volume of air
 at the exhaust port

should be left to idle before stopping.

Have not idled enough
 (4 marks)

- (c) With the aid of a diagram, explain the operation of the Roots blower. (12 marks)



State:

- (i) two disadvantages of using water as a coolant.
- (ii) the function of a thermostat used in the cooling system.

Thermostat - It regulates the engine temperature

- (b) Explain four effects of an overheated engine. (8 marks)

- (c) Using a diagram, explain the operation of bellows type thermostat. (9 marks)

- (a) (i) Explain the reasons for ventilating the crankcase. (9 marks)

- (ii) Using a sketch, explain the operation of a closed engine ventilation system. (10 marks)

It helps to protect the engine increase in a back fire which causes a sudden
 high pressure pulse in the intake manifold.

- (b) With the aid of a diagram, explain the operation of the gear type oil pump. (10 marks)

Effects of overheating engine

- Broken fan belt leads to insufficient coolant
- Ferrous water pump leads to cooling system leaking coolant
- Stuck thermostat

Reasons why the engines are fitted with turbochargers

→ To prevent the intake air so as to increase the quantity of air entering
 entering in the engine cylinder and allowing more fuel to be burnt efficiently

SECTION B: AUTO ELECTRICS

Answer at least TWO questions in this section.

5. (a) State four demerits of using the contact breaker points in the ignition system. (4 marks)

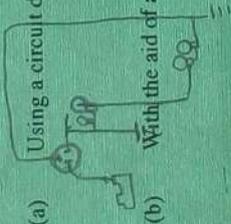
(b) (i) State two advantages of the electronic ignition system. (6 marks)
(ii) With the aid of a circuit diagram, explain the operation of the capacitor discharge ignition system. (16 marks)

Handwritten notes for question 5(b)(ii):
- Point marks are 9, one of them is 10.
- At the side of the cylinder head.
- The top of the cylinder head.

(a) State three: (6 marks)
(i) possible positions of the electronic fuel injectors. (14 marks)
(ii) advantages of the electronic fuel injection system.

Handwritten notes for question 6(a)(ii):
- It gives a direct injection.
- It is accurate in ignition and it is faster.

7. (a) Using a circuit diagram, explain the operation of the directional indicator lights. (10 marks)
(b) With the aid of a diagram, explain the operation of the link type wiper system. (10 marks)



8. (a) Explain three functions of the heating and ventilation system of a vehicle. (6 marks)
(b) Using a sketch, explain the operation of the heating and ventilation system of a vehicle. (14 marks)

Handwritten notes for question 8:
- Cooling - It cools the engine when it is hot.
- Heating - It heats the engine when it is cold.
- Fan - It is used to cool the engine when it is hot.
- Heater - It is used to heat the engine when it is cold.
- Blower - It is used to blow air through the heater.
- Filter - It is used to filter the air.
- Duct - It is used to carry the air from the blower to the heater.
- Control - It is used to control the blower and heater.
- Leaking hoses or cooling system leaking coolant.

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Component of air conditioning system

- Evaporator
- Compressor
- Condenser
- Drier
- Expansion device.

1503/205
ENGINE TECHNOLOGY
AND AUTO ELECTRICS
Oct./Nov. 2018
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
CRAFT CERTIFICATE IN AUTOMOTIVE ENGINEERING

MODULE II

ENGINE TECHNOLOGY AND AUTO ELECTRICS

3 hours

Handwritten: Marks = 1

INSTRUCTIONS TO CANDIDATES

The candidate should have the following for this examination:

Answer booklet;

Non-programmable scientific calculator.

This paper consists of EIGHT questions in TWO sections: A and B.

Answer a total of FIVE questions by choosing at least TWO questions from each section.

All questions carry equal marks.

Maximum marks to each part of a question are indicated.

Candidates should answer the questions in English.



This paper consists of 3 printed pages.

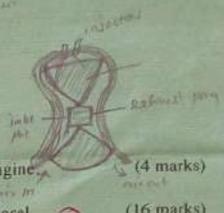
Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

Advantages

- Engine balancing and vibration problem are easily overcome
- low engine noise due to precise lubrication
- improve power to weight ratio

SECTION A: ENGINE TECHNOLOGY

Answer at least TWO questions in this section.



- (a) State two advantages and two disadvantages of the rotary engine. (4 marks)
- (b) With the aid of diagram, explain the operation of a rotary diesel. (16 marks)

- (a) State two advantages and two disadvantages of turbo charging petrol engines. (4 marks)
- Increase exhaust gas engine
 - Improve fuel consumption
 - Require precise lubrication & high speed bearing
 - Must be made of materials that withstand high temperature.

- (b) Explain why engines fitted with turbochargers produce black smoke during accelerations. (4 marks)
- (i) To increase the power output of the engine by supplying compressed air to the engine intake.
- (ii) should be left to idle before stopping, that is because when speeding the car there was not enough fuel in the cylinder and it is exhausted in air.

- (c) With the aid of a diagram, explain the operation of the Roots blower. (12 marks)



- (a) State: (3 marks)
- (i) two disadvantages of using water as a coolant.
 - (ii) the function of a thermostat used in the cooling system.

- (b) Explain four effects of an overheated engine. (8 marks)
- It will die and stop.
 - It will cause damage to the engine.
 - It will cause the engine to overheat.
 - It will cause the engine to lose power.

- (c) Using a diagram, explain the operation of bellows type thermostat. (9 marks)



- (a) (i) Explain the reasons for ventilating the crankcase. (10 marks)
- (ii) Using a sketch, explain the operation of a closed engine ventilation system. (10 marks)
- It helps to protect the engine because of a back fire which causes a sudden high pressure pulse in the intake manifold.

- (b) With the aid of a diagram, explain the operation of the gear type oil pump. (10 marks)



- Effects of overheating engine:
- Broken fan belt
 - Leads to increased coolant
 - Failed water pump
 - Loose hose or cooling system leaking coolant
 - stuck thermostat

Reasons why the engine are fitted with turbo chargers

1503/205
Oct/Nov 2018 → To force out the intake air so as to increase the quantity of air entering the engine cylinder and allowing more fuel to be burnt efficiently.

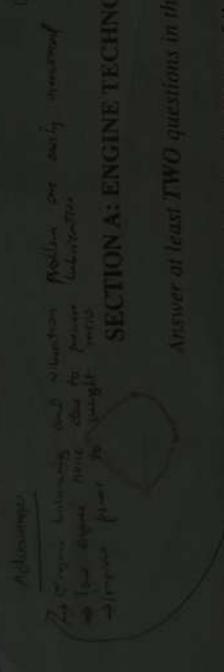
Advantages:
→ Engine balancing and vibration problem are easily overcome
→ low engine noise due to precise lubrication
→ improve power to weight ratio

SECTION A: ENGINE TECHNOLOGY

Answer at least TWO questions in this section. (16 marks)

(a) State two advantages and two disadvantages of the rotary engine. (4 marks)

(b) With the aid of diagram, explain the operation of a rotary diesel. (16 marks)



Reason why the engine are fitted with turbo chargers

- Broken fan belt
- Leads to increased coolant
- Failed water pump
- Loose hose or cooling system leaking coolant
- stuck thermostat

Reason why the engine are fitted with turbo chargers

→ To force out the intake air so as to increase the quantity of air entering the engine cylinder and allowing more fuel to be burnt efficiently.

1503/205
Oct/Nov 2018

150

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SECTION B: AUTO ELECTRICS

Answer at least TWO questions in this section.

5 (a) State four ~~demerits~~ ^{advantages} of using the contact breaker points in the ignition system. (4 marks)

(b) (i) State two advantages of the electronic ignition system.

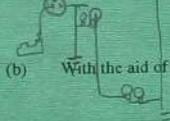
(ii) With the aid of a circuit diagram, explain the operation of the capacitor discharge ignition system. (16 marks)

6 (a) State three:

(i) possible positions of the electronic fuel injectors.
(ii) advantages of the electronic fuel injection system. (6 marks)

(b) With the aid of a diagram, explain the operation of the D-Jetronic petrol injection system. (14 marks)

7 (a) Using a circuit diagram, explain the operation of the directional indicator lights. (10 marks)



(b) With the aid of a diagram, explain the operation of the link type wiper system. (10 marks)

8 (a) Explain three functions of the heating and ventilation system of a vehicle. (6 marks)

(b) Using a sketch, explain the operation of the heating and ventilation system of a vehicle. (14 marks)

- Failed water pump
- leads to insufficient coolant
- Broken fan belt
- Pressure and radiator and heater hoses and cause them to burst under additional pressure
- Leaking hoses or cooling system leaking coolant.

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Component of an air conditioning system

- Evaporator
- Compressor
- Condenser
- Drier
- Expansion device

1503/205
ENGINE TECHNOLOGY
AND AUTO ELECTRICS
Oct./Nov. 2018
Time: 3 hours



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

Handwritten: $\frac{1}{2} \times 1 = 1$

ENGINE TECHNOLOGY AND AUTO ELECTRICS
3 hours

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1503/205
ENGINE TECHNOLOGY
AND AUTO ELECTRICS
Oct./Nov. 2018
Time: 3 hours

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