2503/305
AUTO ELECTRICS AND
ELECTRONICS
Oct. / Nov. 2021
Time: 3 Hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN AUTOMOTIVE ENGINEERING

MODULE III

AUTO ELECTRICS AND ELECTRONICS

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
Answer booklet;
Drawing instruments.
This paper consists of EIGHT questions in TWO sections; A and B.
Answer FIVE questions taking at least TWO questions from each section.
All questions carry equal marks.
Candidates should answer the questions in English.

This paper consists of 4 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 **TWO** questions from this section.*

1. (a) State **four** advantages of electronic fuel injection system. (4 marks)

   (b) With the aid of a diagram, explain the operation of the metering and fuel distribution unit of a K-jetronic fuel system. (16 marks)

2. (a) State **two**:

   (i) functions of an air conditioning system.

   (ii) types of refrigerants. (4 marks)

   (b) With the aid of a diagram, explain the operation of an air conditioning system of a car. (16 marks)

3. (a) With the aid of a diagram, explain the operation of a permanent magnet windscreen wiper system. (10 marks)

   (b) With the aid of a diagram, explain the operation of an electric horn. (10 marks)

4. (a) State **four** advantages of an electronic ignition system. (4 marks)

   (b) With the aid of a diagram, explain the operation of a transistor ignition system. (16 marks)

SECTION B

*Answer at least **TWO** questions from this section.*

5. (a) State **two** causes for each of the following charging system faults:

   (i) charging lamp stays on;
   (ii) alternator does not charge. (4 marks)

   (b) A faulty alternator has been brought to the workshop for repair. Describe the procedure followed in overhauling and explain the tests carried out in each case. (16 marks)

6. (a) State **two** causes for each of the following starter motor faults:

(i) starter motor chatters;
(ii) no cranking.

(4 marks)

(b) Describe the procedure of overhauling a light duty starter motor. Assume the unit is still mounted on the engine. (16 marks)

7. Complete the lighting circuit shown in **figure 1**. Cut the answer sheet along the dotted line and hand it in together with the answer booklet. (20 marks)

8. (a) State **two** causes for each of the following car alarm faults:

(i) alarm goes off randomly; Loose connection
(ii) alarm produces noise continuously. (4 marks)

(b) Describe the procedure of installing an alarm system in a vehicle. (16 marks)

- Attach the siren hanging
- Place the horn of siren facing down to
- Drill a hole in the outer of the car/to access the siren
- Place the alarm power line near the car battery ready to be attached
- Attach a fuse to the live terminal wire
- Connect the alarms instructive manual
- Mount the shock sensors
- Drill a hole in the dash board for the led
- Feed the led indicator wire through the hole and secure it with double side mounting tape
- Locate the wire that connects the light button on the car
- Connect the sensor to this wire
- Secure and attach all alarm input and output to the sensor
- Mount the module under the dashboard
- Bundle together all the wires and staff them under the dashboard
- Connect the alarm power wire to the car battery
- test the alarm for functions

K-Jetronic

It has injection valves that inject fuel continuous into the intake port where it mixes with air
From the intake valves then the air fuel mixture is drawn inside the Combustion Chamber
It has three main function areas air-flow measure fuel supply and fuel metering
The air-flow is controlled by a throttle valve and it can be either help of air flow sensors
The fuel supply is achieved by the fuel distributor and air accumulator and filter
The fuel metering is depended on the position of the throttle

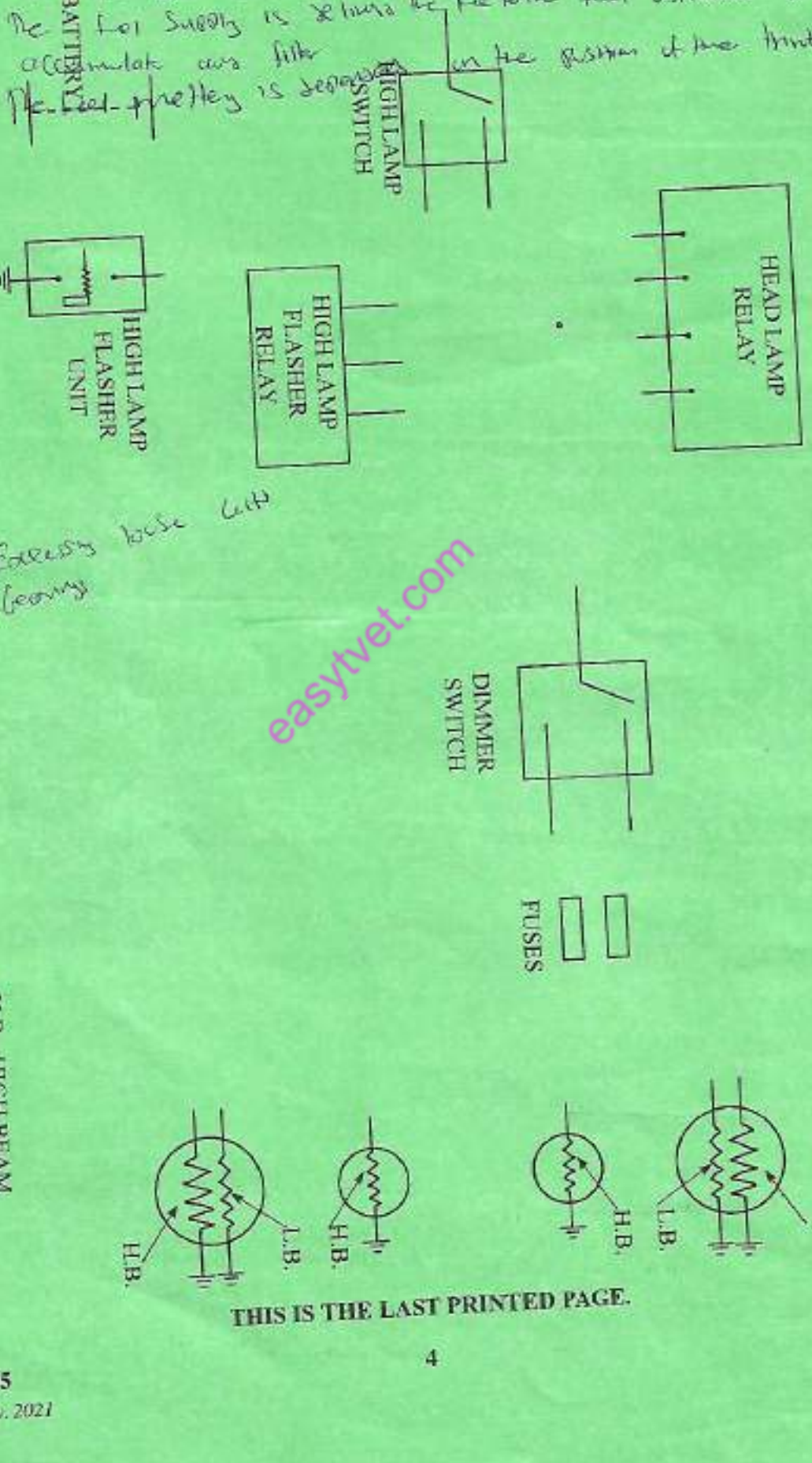

FIG. 1

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