

1503/105

VEHICLE TECHNOLOGY,
WORKSHOP TECHNOLOGY
AND BODY WORK

Oct./Nov. 2017

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN AUTOMOTIVE ENGINEERING

MODULE I

VEHICLE TECHNOLOGY, WORKSHOP TECHNOLOGY AND
BODY WORK

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:*

*At least **TWO** questions from section A; at least **ONE** question from section B and at least **ONE** question from section C.*

All questions carry equal marks.

Maximum marks for each part of a question are as shown.

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.

SECTION A: VEHICLE TECHNOLOGY

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

1. (a) State **two** advantages and **two** disadvantages of an automatic gearbox. (4 marks)
- (b) With the aid of a labelled diagram, explain the operation of a semi-automatic gearbox of a vehicle. (16 marks)
2. (a) State **three** factors that affect a vehicle's braking efficiency. (3 marks)
- amount of fluid
- type of fluid
- Wifanye*
B (b) State **three** advantages of disc brake over drum brakes. (3 marks)
- (c) With the aid of a diagram, explain the operation of a disc brake assembly. (14 marks)
3. (a) State the reason for restricting the driver's assistance in the steering system. (1 mark)
- (b) State **four** advantages of power assisted steering system. (4 marks)
Feedback is highly sensitized. Promote true rolling motion.
Low operating effort
- (c) With the aid of a diagram, explain the operation of power assisted steering system. (15 marks)
4. (a) State **three** advantages of independent front suspension over beam axle and leaf spring arrangements. (3 marks)
- (b) State **four** functions of a vehicle suspension system. (4 marks)
- It supports the weight of the vehicle
- The axle front and rear axle are correctly located
- (c) With the aid of a labelled diagram, explain the operation of hydrostatic suspension. (13 marks)

SECTION B: WORKSHOP TECHNOLOGY

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

5. (a) State **four** workshop safety rules to be observed in an automotive workshop. (4 marks)
- hair
- boots
- overalls
- (b) Explain where the following fire extinguishers are used:
- (i) foam;
- (ii) dry powder;
- (iii) carbon dioxide.

(6 marks)

(c) Outline the use of the following tools in sheet metalwork:

- (i) mallet;
- (ii) hollowing hammer;
- (iii) sinking hammer;
- (iv) bench stakes;
- (v) hand groover.

(10 marks)

6. (a) State **four** requirements of an engineer's steel rule.

(4 marks)

(b) Describe the right hand gas welding technique with the aid of a sketch and explain the effects of blowpipe filler rod angles on the weld bead.

(6 marks)

(c) Describe the procedure to turn the limit gauge shown at figure 1 below, on a lathe machine, from a piece of cast steel material 35 mm by 136 mm long. Include sketches.

(10 marks)

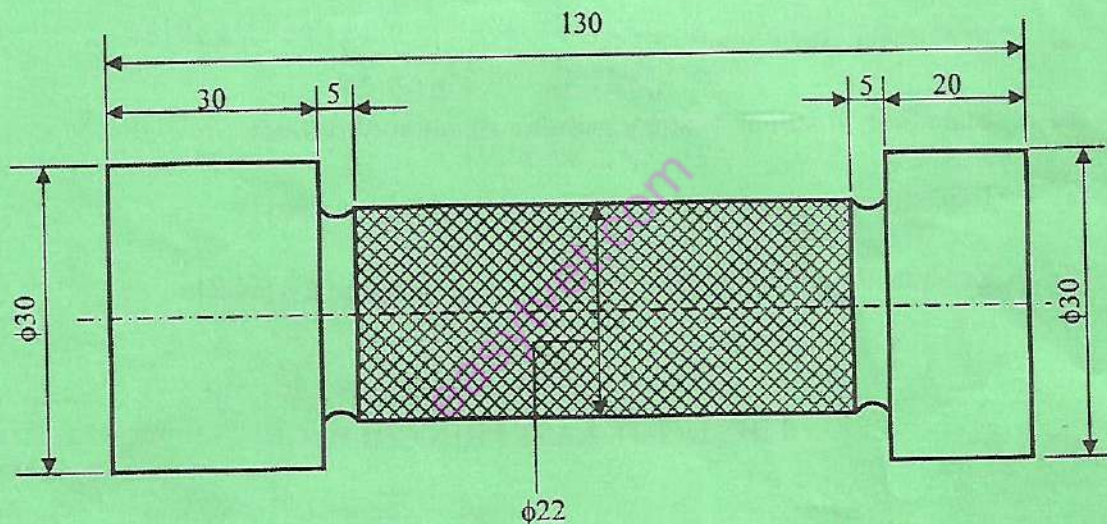
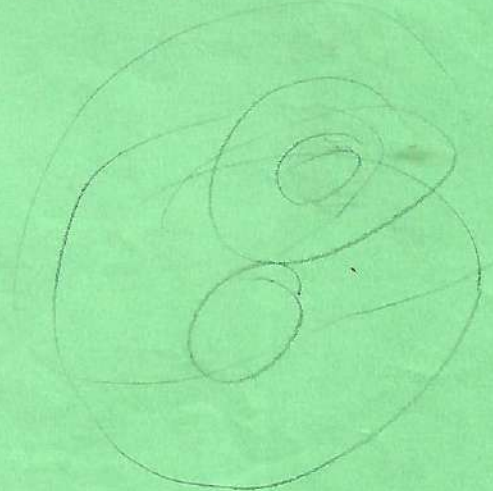


Fig. 1

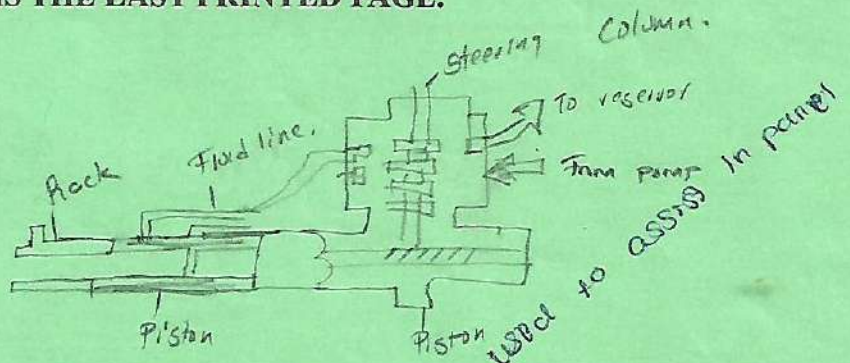
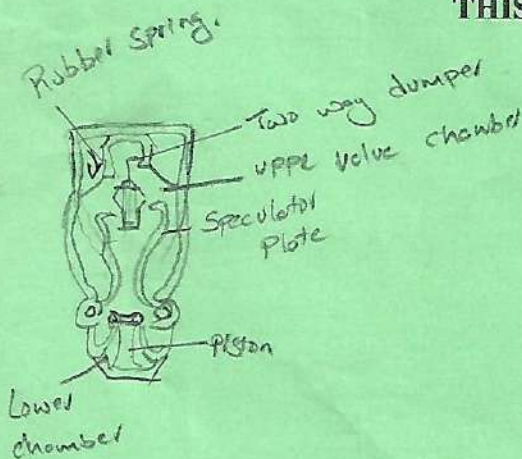


SECTION C: BODYWORK

Answer at least ONE question from this section.

7. (a) State a reason why the vehicle frame is narrow toward the front and wide at the main body. (2 marks)
- (b) State four advantages of an integrated frame. (4 marks)
- (c) Explain three qualities of upholstery materials. (6 marks)
- (d) Sketch the following panel beating tools:
- (i) pick hammer;
 - (ii) short elbow and curved spoon;
 - (iii) mushroom dolly block;
 - (iv) vehicle body file. (8 marks)
8. ✓ (a) State three constituents of paint. (3 marks)
- Vehicle Pigment
- thinner
- enamel
- (b) State four functions of spray painting an automobile body. (4 marks)
- (c) Explain any three defects found in vehicle body panels. (6 marks)
- (d) Describe the procedure to follow when spray painting a vehicle. (7 marks)

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Enamel

Support vehicle weight
 Provide smooth ride
 Prevent excessive vehicle dive
 Support
 Keep tyre in firm with road
 Allow front wheel move side to side

This is because the steering system is most responsible to the direction, which can lead to make accident when you apply great force.