

29.18 POWER MECHANICS (447)

29.18.1 Power Mechanics Paper 1 (447/1)

447/1

POWER MECHANICS

Paper 1

Oct./Nov. 2008

2½ hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

Kenya Certificate of Secondary Education

POWER MECHANICS

Paper 1

Theory

2½ hours

Instructions to candidates

Candidates should have the following materials for this examination:

Answer booklet

Drawing instruments

Drawing paper size A3.

This paper has TWO sections: A and B.

Answer ALL the questions in section A. Answer question 11 and any other THREE questions from section B.

All dimensions are in millimetres unless otherwise stated.

Candidates may be penalised for not following the instructions given in this paper.

This paper consists of 6 printed pages.

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

SECTION A (40 marks)

Answer ALL the questions in this section.

- 1 (a) State **two** safety precautions to be observed when using a file. (1 mark)
- (b) List **four** career development opportunities available to an automotive engineering diploma holder. (2 marks)
- 2 (a) State **one** use of each of the following instruments as used in engine service:
- (i) tachometer;
 - (ii) stethoscope. (2 marks)
- (b) List **four** materials used to make gaskets. (2 marks)
- 3 (a) Name the type of locking devices used for each of the following vehicle components:
- (i) big-end bearing cap bolts;
 - (ii) cylinder head nuts;
 - (iii) steering box adjustment screw. (1½ marks)

- (b) Name the **four** types of riveted joints shown in figure 1. (2 marks)

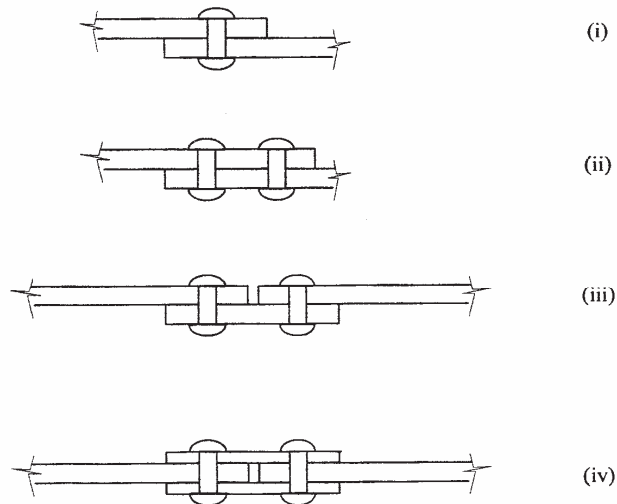


Figure 1

- 4 (a) State **four** characteristics of a good flux. (2 marks)
- (b) Give **two** examples of dry lubricant. (1 mark)

- 5 (a) Name parts (a),(b), (c) and (d) of the camlobe shown in figure 2. (2 marks)

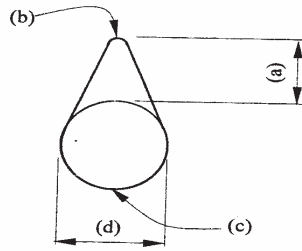


Figure 2

- (b) Give **three** advantages of a pressurized water cooling system over thermo-syphon cooling system. (2 marks)
- 6 (a) State **two** possible causes why a petrol engine would emit white or light blue smoke at its exhaust pipe. (3 marks)
- (b) State **two** possible reasons of a spongy brake pedal. (2 marks)
- 7 (a) Give **two** reasons for inclining the kingpin of a vehicle steering system. (2 marks)
- (b) State **three** advantages of a rear engine rear wheel drive vehicle over a front engine rear wheel drive vehicle. (3 marks)
- 8 (a) Differentiate between a cross ply and radial tyres. (2 marks)
- (b) Name the type of chassis cross-sections shown in figure 3. (1 mark)

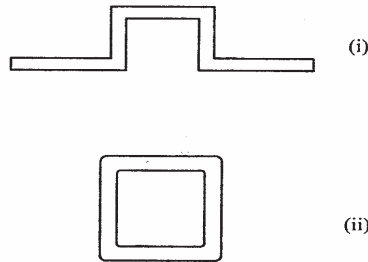


Figure 3

- 9 (a) State the operational difference between a single-acting damper and a double-acting damper. (2 marks)
- (b) State **three** factors that determine the friction of a surface. (1½ marks)
- 10 (a) Sketch the conventional symbols for each of the following:
- (i) push button normally-open switch;
 - (ii) 6 – volt battery;
 - (iii) milliammeter.
- (3 marks)

(b) Sketch the following types of screw thread and for each indicate the pitch:

- (i) square;
- (ii) metric.

(3 marks)

SECTION B (60 marks)

Answer question 11 and any other **THREE** questions from this section. Candidates are advised to spend **not more than 25 minutes** on question 11.

11 Figure 4 shows an isometric drawing of a fork end of a towing bar.

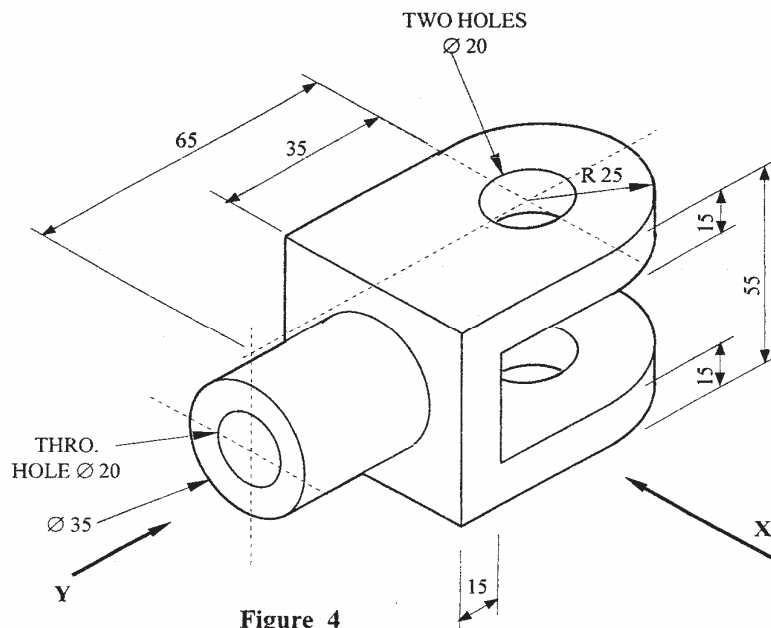


Figure 4

Draw full size, in third angle projection, the following views:

- (a) Front elevation in the direction of arrow X
- (b) End elevation in the direction of arrow Y
- (c) Plan

Indicate three leading dimensions.

(15 marks)

12 With the aid of a labelled diagram, explain the operation of a coil ignition system of a multi-cylinder engine.

(15 marks)

13 (a) State **two** advantages and **two** disadvantages of brazing over fusion welding.

(4 marks)

(b) Explain **four** possible causes of a bad brazed joint.

(4 marks)

(c) Outline the procedure of brazing a joint.

(7 marks)

14 (a) State **two** advantages of a two-stroke engine over a four-stroke petrol engine. (2 marks)

(b) Figure 5 shows a two-stroke petrol engine.

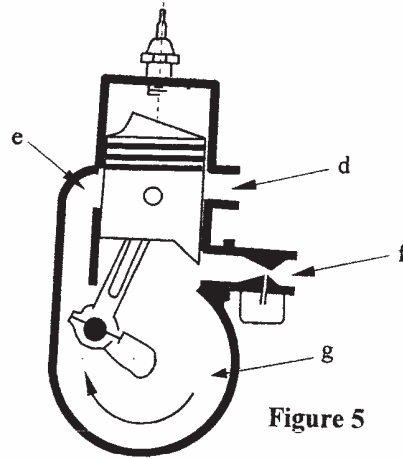


Figure 5

- (i) Name the parts labelled **d**, **e**, **f** and **g**.
- (ii) Explain the operation of the engine starting from the position shown in the diagram. (13 marks)

15 Figure 6 shows a cross-section of a fuel injector of a diesel engine.

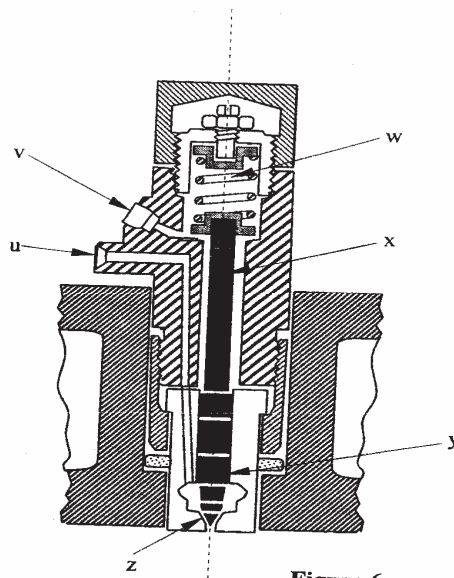


Figure 6

- (a) Name the parts labelled **U** to **Z**. (3 marks)
- (b) Explain the operation of the injector. (12 marks)