

4.7 POWER MECHANICS (447)

4.7.1 Power Mechanics Paper 1 (447/1)

SECTION A (40 marks)

Answer *all* the questions in this section.

- 1 (a) Name **two** areas in a power mechanics workshop which require ventilation. (1 mark)
- (b) Name **two** automotive trade courses offered at the Directorate of Industrial Training. (1 mark)
- 2 (a) Sketch a countersunk rivet and label **two** main parts. (2 marks)
- (b) Use sketches to differentiate between Acme and butress type of screw thread. (2 marks)
- 3 (a) State the **two** major classifications of greases. (1 mark)
- (b) (i) State the meaning of the term volatile as applied to materials.
(ii) Give **two** examples of volatile materials. (2 marks)
- 4 (a) State the meaning of each of the following engine terminologies:
(i) bore;
(ii) throw;
(iii) volumetric efficiency. (3 marks)
- (b) State **two** functions of the charging system in an engine. (2 marks)
- 5 (a) Name **three** checks that must be carried out when fitting new piston rings on a dismantled single cylinder engine piston. (3 marks)
- (b) Figure 1 shows two measurements A and B performed as an engine component.

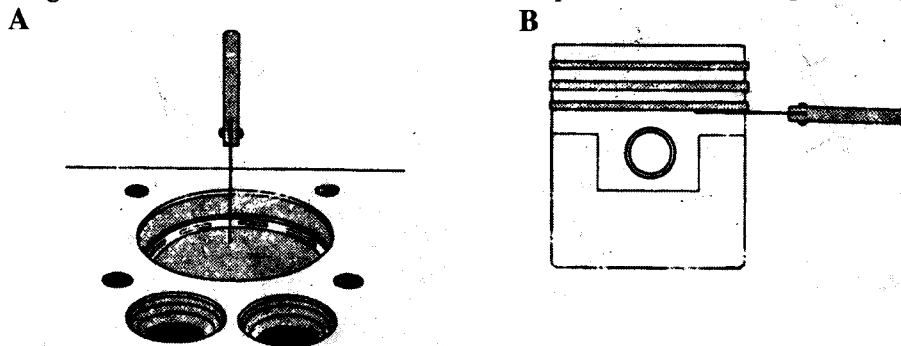
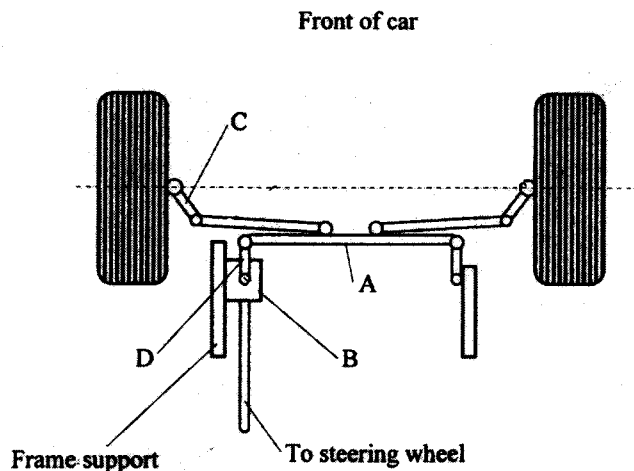


Figure 1

Name the measurement, the component and the tool used in each case. (3 marks)

- 6 (a) State the function of each of the following components in a vehicle electrical circuit:
- (i) diode;
 - (ii) relay. (2 marks)
- (b) State **four** possible causes of engine backfiring. (2 marks)
- 7 (a) Sketch and name **two** types of tyre tread patterns. (2 marks)
- (b) List **four** different components that are involved in absorbing shock when a vehicle hits a bump. (2 marks)
- 8 (a) State the meaning of each of the following as used in hydraulic braking system:
- (i) Bleeding;
 - (ii) Flushing. (2 marks)
- (b) Figure 2 shows a simplified drawing of a steering system.



- Name the parts labelled A to D. (2 marks)
- 9 (a) Name **two** types of vehicle rear axles. (1 mark)
- (b) Differentiate between dead and live axles. (2 marks)
- 10 (a) State how the size of each of the following tools is determined:
- (i) open end spanner;
 - (ii) ball pein hammer. (2 marks)
- (b) Make a freehand drawing of straight snips and label **two** main parts. (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 3 shows an isometric drawing of an engine mounting. Draw, full size in first angle projection the following views:

- (a) Front elevation in the direction of arrow A;
- (b) End elevation;
- (c) Plan.

(15 marks)

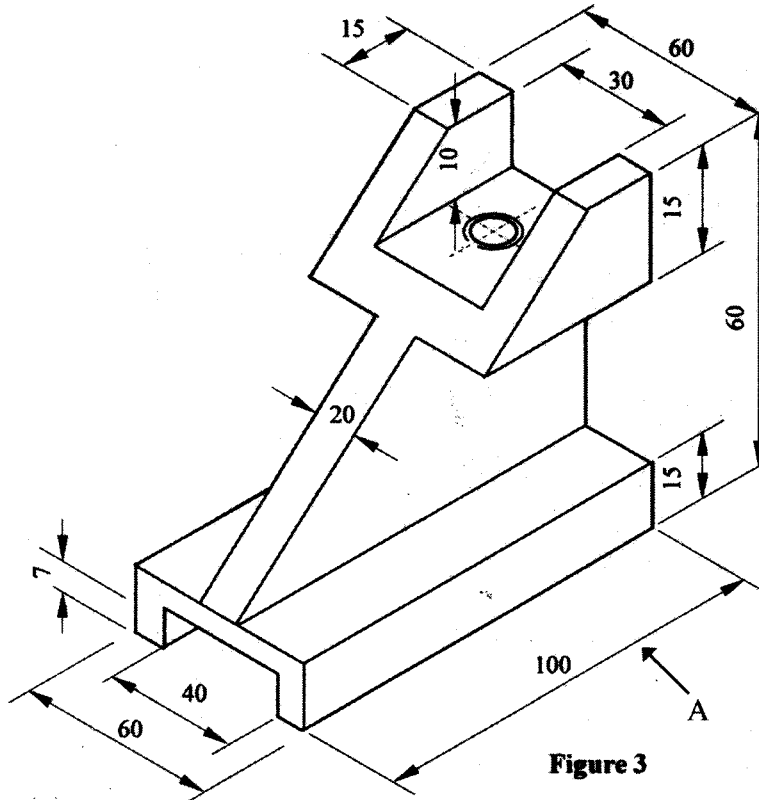


Figure 3

12 (a) Name **four** types of fuel used in motor vehicle engines.

(2 marks)

(b) Figure 4 shows the layout of a compression ignition engine fuel system.

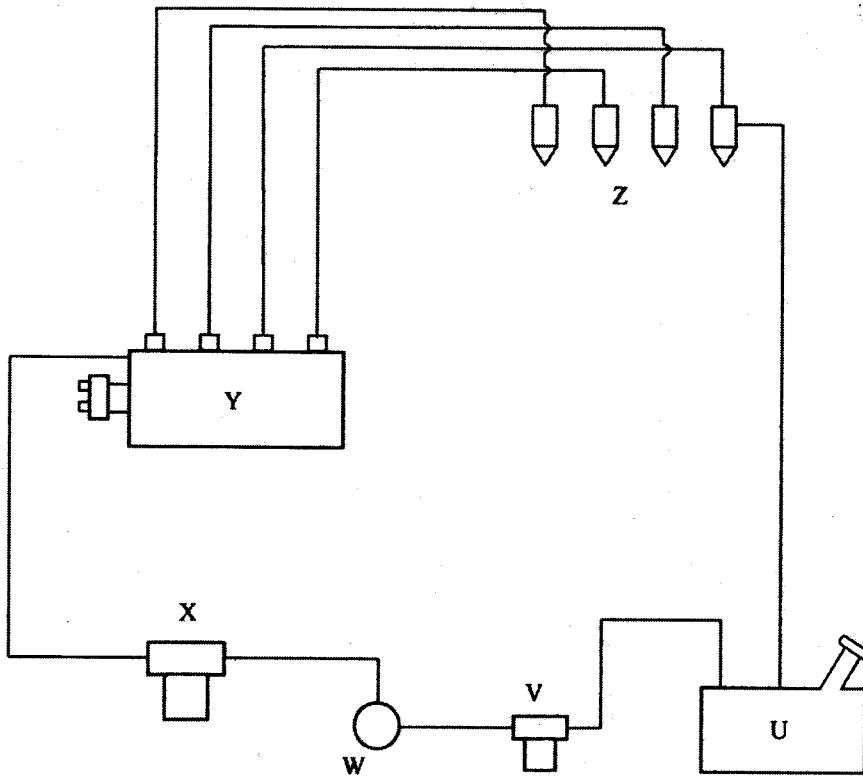


Figure 4

- (i) Name the parts labelled U, V, W, X, Y and Z. (3 marks)
- (ii) Explain how the system operates. (10 marks)

13 (a) Explain the use of the following units in a propeller shaft:

- (i) universal joint;
- (ii) slip joint. (2 marks)

(b) With the aid of a labelled diagram, explain the operation of a differential unit when a vehicle is taking a turn. (13 marks)

14 (a) State **three** advantages of disc brakes over drum brakes. (3 marks)

(b) With the aid of a labelled diagram, describe the construction of the drum brakes assembly. (12 marks)

15 (a) Illustrate the following frame sections used in a motor vehicle:

- (i) channel;
- (ii) box;
- (iii) tubular. (3 marks)

(b) Describe **four** types of car bodies. (6 marks)

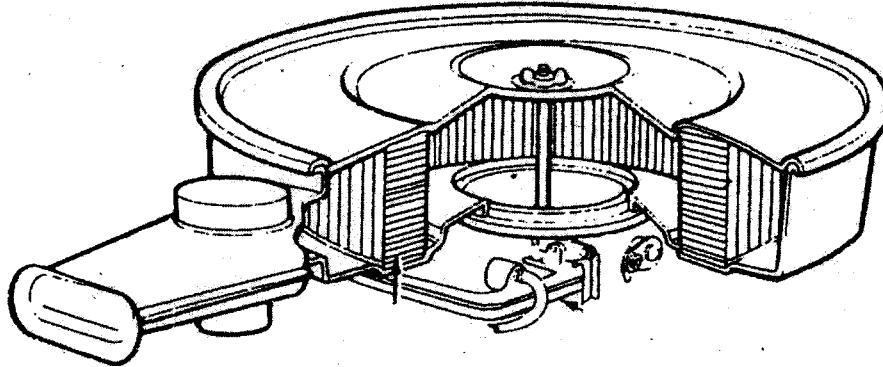
(c) Explain the **three** methods of checking minor chassis frame misalignment. (6 marks)

4.7.2 Power Mechanics Paper 2 (447/2)

STATION 1

The figure below shows a truncated air cleaner assembly. On the drawing paper provided, sketch in good proportion the exploded view of the assembly and label **four** parts.

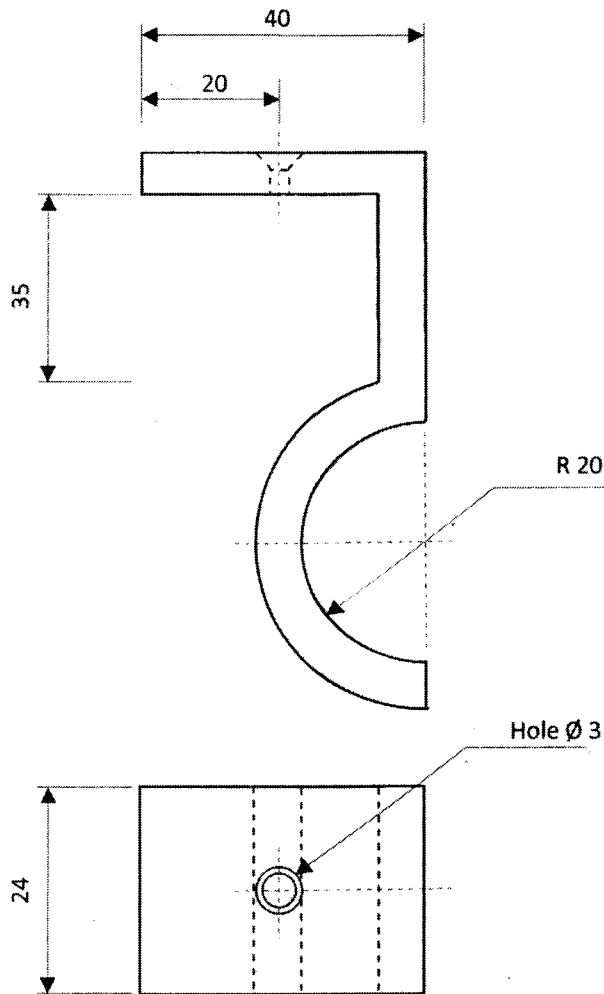
(10 marks)



STATION 2

Using the tools, equipment and materials provided, make the support bracket as shown in the figure below.

(10 marks)



Standard width of flat bar

STATION 3

- (a) Identify the substances in the containers labelled **V** to **Z** and state the use of each in motor vehicle servicing. (5 marks)

SUBSTANCE	NAME	APPLICATION IN SERVICING
V		
W		
X		
Y		
Z		

- (b) Identify the fasteners labelled **P** to **T** and state a feature that makes each fastener unique in its class. (5 marks)

FASTENER	NAME	UNIQUE FEATURE
P		
Q		
R		
S		
T		

STATION 4

Using the tools provided, determine the compression ratio of the given engine. Take the clearance volume to be 30 c.c. (10 marks)

STATION 5

State the name, class and use of the tools provided labelled A to E as shown in the table below.

(10 marks)

TOOL	NAME	CLASS	USE
	Steel rule	Layout	Measuring linear dimensions
A			
B			
C			
D			
E			

STATION 6

Using the tools and materials provided, make the flange gasket to fit the given water pump.

(10 marks)

STATION 7

Name the vehicle parts labelled F, G, H, J and K. For each part, identify **one** defect, state **two** possible effects and complete the table below. (10 marks)

PART	NAME	DEFECT	EFFECTS
F			
G			
H			
J			
K			

STATION 8

Using the tools, materials and components provided, connect the starting circuit of a vehicle. (10 marks)

STATION 9

For the tyre provided:

- (a) Identify and record the following:
- (i) Maximum load
 - (ii) Maximum inflation limit
 - (iii) Type of construction

 - (iv) Tyre size
 - (v) Rim size
 - (vi) Date of manufacture

- (b) Identify the defect at the section marked X and state one possible cause of the defect. (3 marks)

DEFECT.....

POSSIBLE CAUSE.....

- (c) Demonstrate to the examiner how to measure the following: (2 marks)

(i) inside diameter

(ii) height

(iii) width

(iv) tread depth

(v) tread width

(5 marks)

STATION 10

- (a) Using the multicylinder engine provided, demonstrate to the examiner how to identify the misfiring cylinder. (6 marks)

(b) State:

- (i) two possible causes of the misfiring in (a) above. (2 marks)

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- (ii) how each cause in (b)(i) above is determined. (2 marks)