

3.19 POWER MECHANICS (447)

3.19.1 Power Mechanics Paper 1 (447/1)

SECTION A: (40 marks)

*Answer **all** the questions in this section*

- 1** (a) List **three** factors to be considered when putting up a motor vehicle spare parts shop. (3 marks)
- (b) Explain **two** reasons why it is important to study power mechanics. (2 marks)
- 2** (a) State the full terms represented by the following engineering drawing abbreviations:
- (i) CL;
- (ii) Ø;
- (iii) CSK;
- (iv) A/F. (2 marks)
- (b) Name **two** classes of fire and for each class, identify **one** appropriate commercial fire extinguisher. (2 marks)
- 3** (a) State **two** advantages of self-tapping screws over ordinary screws. (2 marks)
- (b) (i) Sketch an adjustable spanner. (1 mark)
- (ii) State where long nose pliers may be used in a small engine. (1 mark)
- 4** (a) Explain **one** purpose of each of the following energy convertors in a motor vehicle:
- (i) alternator; (1 mark)
- (ii) photo voltaic cells. (1 mark)
- (b) State **two** effects of adding each of the following alloying materials to carbon steel:
- (i) Nickel; (1 mark)
- (ii) Molybdenum. (1 mark)
- 5** With the aid of sketches, differentiate between a 4 cylinder in line and a V-4 cylinder engine block. (4 marks)

- 6 Figure 1 shows a sectional view of a Wankel engine. Describe **one** cycle of its operation with reference to **C** and **D**. (4 marks)

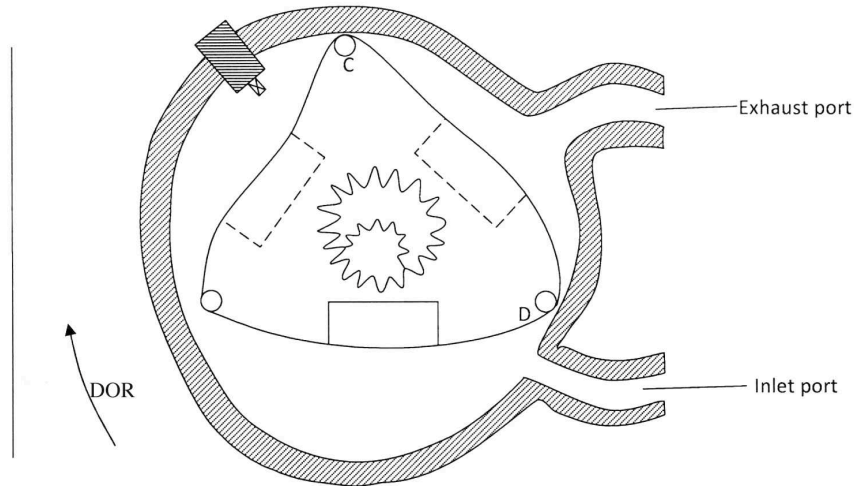


Figure 1

- 7 (a) Name the main components of the power transmission system of a motor vehicle. (2 marks)
- (b) Explain the reason why modern vehicles are designed with collapsible steering columns. (2 marks)
- 8 (a) Briefly explain the process of hard soldering. (3 marks)
- (b) Explain the following terms as used in drum brake operation:
- (i) leading shoe;
 - (ii) trailing shoe. (2 marks)
- 9 (a) State the purpose of the ply-rating of a tyre. (2 marks)
- (b) State **two** advantages of an independent suspension system over rigid beam suspension system. (1 mark)
- 10 Sketch a dipped beam light path having an offset filament and label its parts. (3 marks)

SECTION B: (60 marks)

*Answer question **II** and any other **three** questions.*

- 11** Figure 2 shows an isometric view of a Vee block resting on one side.

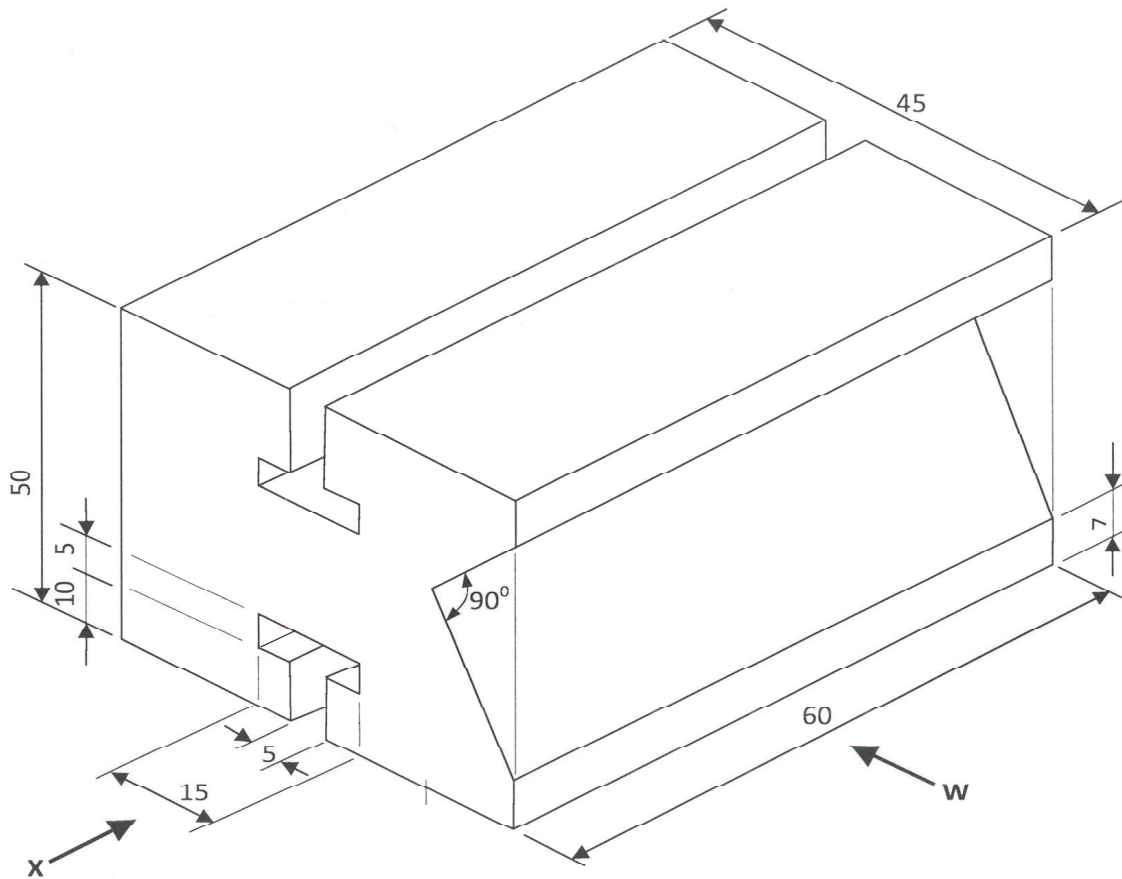


Figure 2

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

- (a) front elevation in the direction of arrow **W**;
- (b) end elevation in the direction of arrow **X**;
- (c) Plan.

(Use A3 paper provided)

(15 marks)

- 12 Figure 3 shows a component of the power transmission system of a motor vehicle.

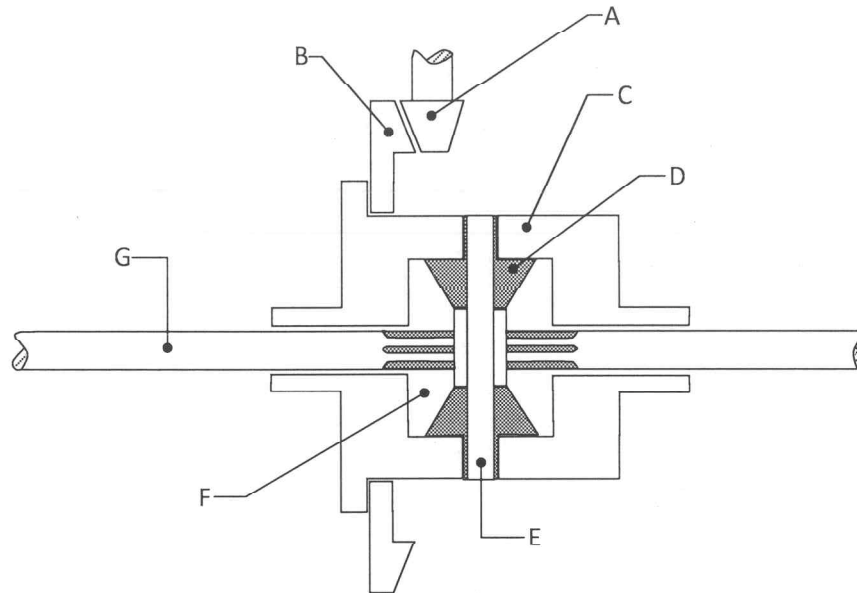


Figure 3

- (a) Name the component. ($\frac{1}{2}$ mark)
- (b) Name parts labelled A to G. ($3\frac{1}{2}$ marks)
- (c) Explain how the component operates. (11 marks)
- 13 With the aid of a labelled diagram, explain the operation of an overhead valve engine train whose camshaft is in the engine block. (15 marks)
- 14 With the aid of labelled diagrams, explain the operation of a four-stroke compression ignition system. (15 marks)
- 15 (a) State **three** advantages of disc brakes over drum brakes. (3 marks)
- (b) Sketch a sectional diagram of a disc brake assembly and label six parts. (12 marks)