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)

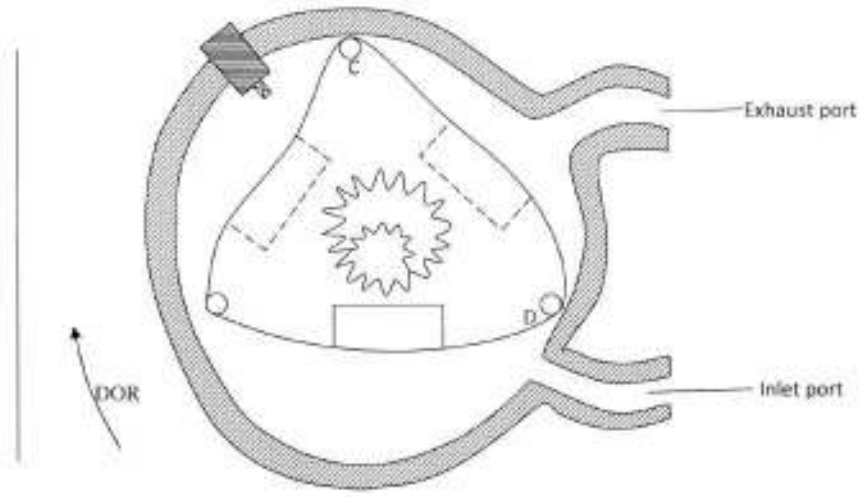

Figure 1

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 **11** and any other **three** questions.*

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

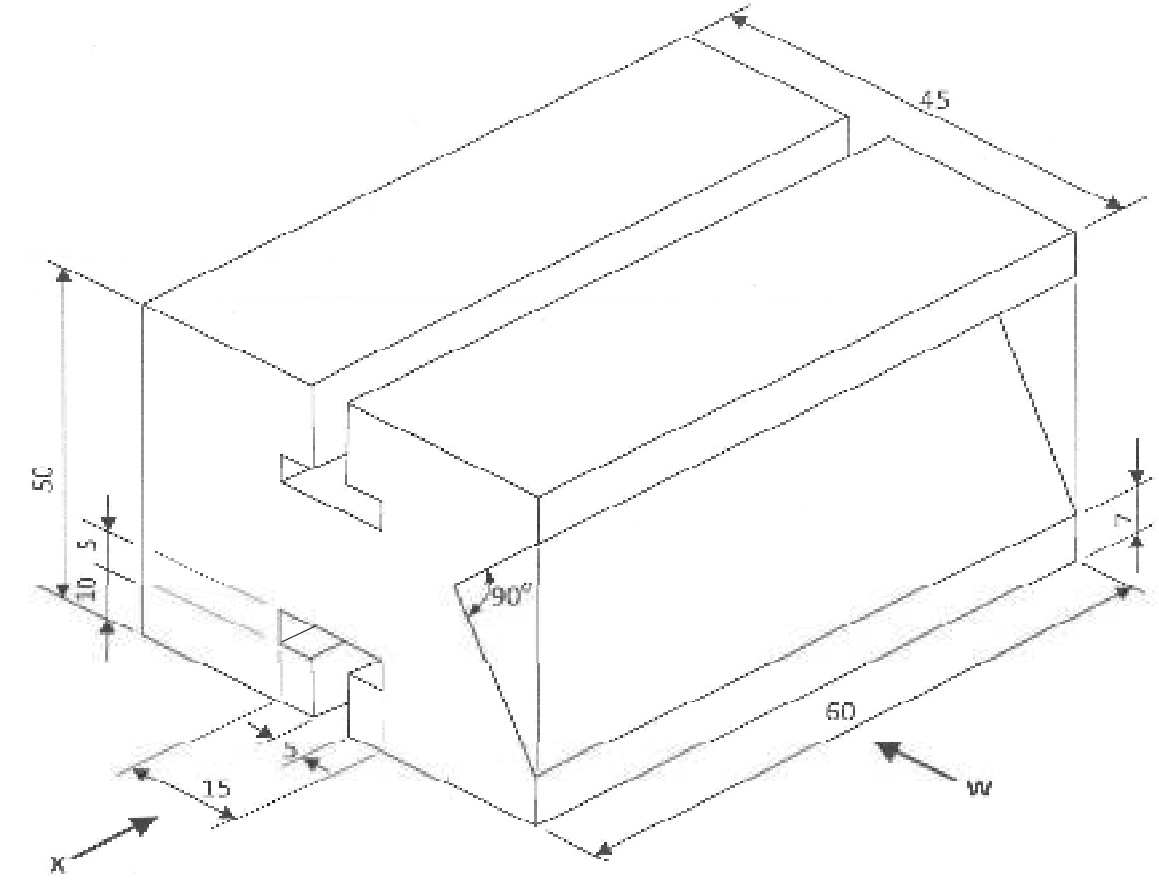

Figure 2

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.

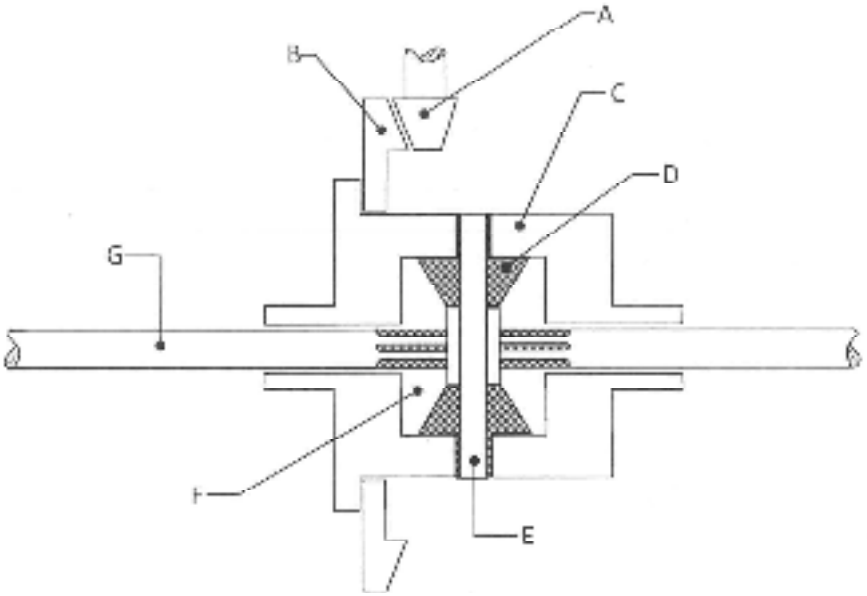

Figure 3

(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