

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 in the spaces provided.

1. (a) Define the term “power”. (1 mark)
- (b) Define the job descriptions of the following careers open to a power mechanics graduate after further training. (3 marks)
- (i) Automotive mechanic
 - (ii) Power plant mechanic
 - (iii) Automotive parts dealer
2. (a) State the most appropriate type of fire extinguisher for putting out the fires caused by the following: (2 marks)
- (i) Electrical short circuits
 - (ii) Firewood
 - (iii) Flammable liquids
 - (iv) Combustible materials
- (b) Name **four** thread series commonly used in engineering. (2 marks)
3. (a) **Figure 1** shows a micrometer setting. If the accuracy of the micrometer is 0.01 mm, determine the reading of the micrometer. (2 marks)

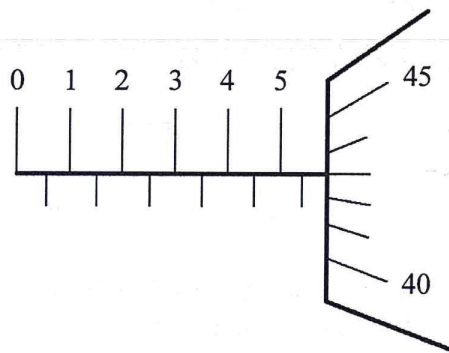


Figure 1

- (b) State **two** areas where each of the following fasteners is used in motor vehicle. (2 marks)
- (i) Splines

- (ii) Keys
4. (a) Outline the procedure of cutting an internal opening on a piece of metal using a chisel. (2 marks)
- (b) Differentiate between the energy conversion in a Starter Motor and a D.C. Generator. (2 marks)
5. (a) List **four** parts of the jet propulsion engine. (2 marks)
- (b) State the functions of the following components of the ignition system: (2 marks)
- (i) Condenser
- (ii) Spark plug
6. (a) State **two** methods of driving the camshaft in a single cylinder engine. (2 marks)
- (b) Name the components driven by the following parts of a camshaft of a multi-cylinder engine. (2 marks)
- (i) Spiral gear
- (ii) Eccentric cam
7. (a) State the operational difference between a thermosyphon and a pressurised cooling system. (2 marks)
- (b) State **two** functions of the gearbox. (2 marks)
8. (a) State the purpose of each of the following head lamp units: (2 marks)
- (i) Reflector
- (ii) Lens
- (b) State **three** materials used to make each of the following: (3 marks)
- (i) Soft solders
- (ii) Hard solders
9. (a) Name **four** parts of air brake system. (2 marks)
- (b) State **two** methods of attaching the wheel hubs to the axle shafts. (1 mark)
10. (a) Give **two** possible causes of a vehicle swaying when taking a turn. (2 marks)
- (b) Explain each of the following terms as used in a steering system: (2 marks)
- (i) Kingpin inclination
- (ii) Included angle

SECTION B (60 marks)

Answer **question 11** on the A3 paper and any other **three** questions from this section in the spaces provided. Candidates are advised to spend **not more than 25 minutes** on question 11.

- 11.** Figure 2 shows **three** orthographic views of a casting for a stand drawn in first angle projection.

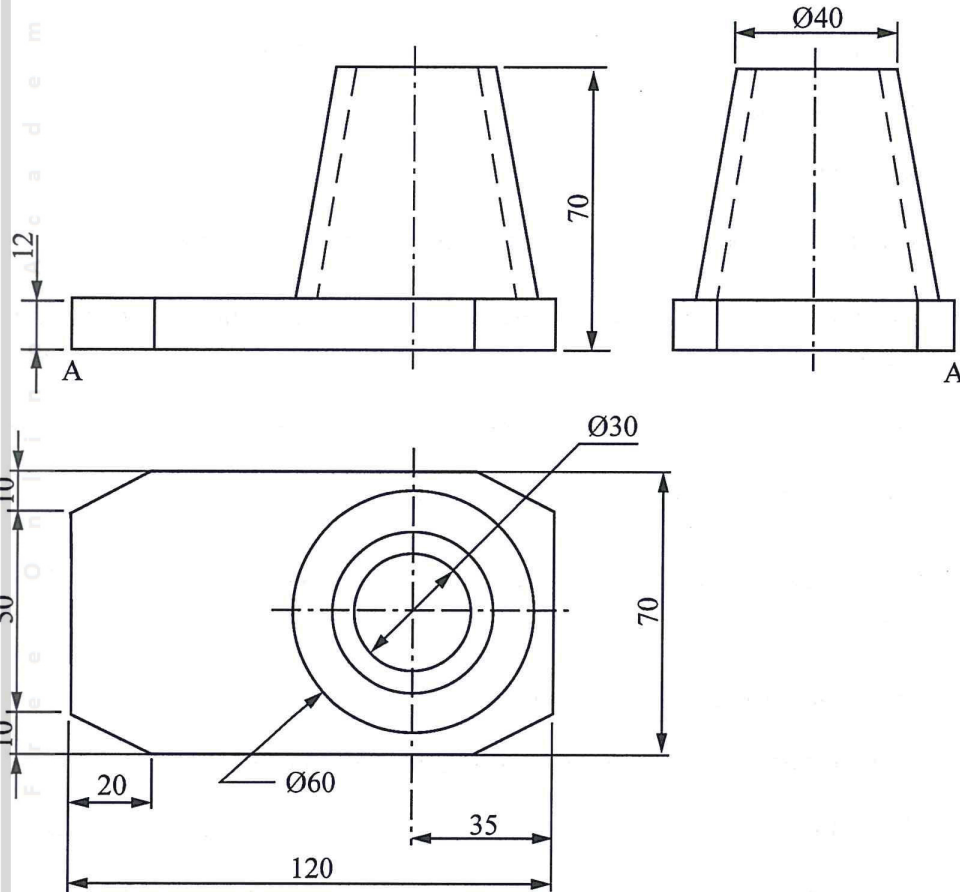


Figure 2

On the A3 paper provided, draw the casting **Full Size** in **isometric projection** taking **A** as the lowest point. (15 marks)

- 12.** With the aid of a labelled diagram, explain the operation of a two stroke diesel engine with two exhaust valves. (15 marks)

13. Figure 3 shows a vehicle component.

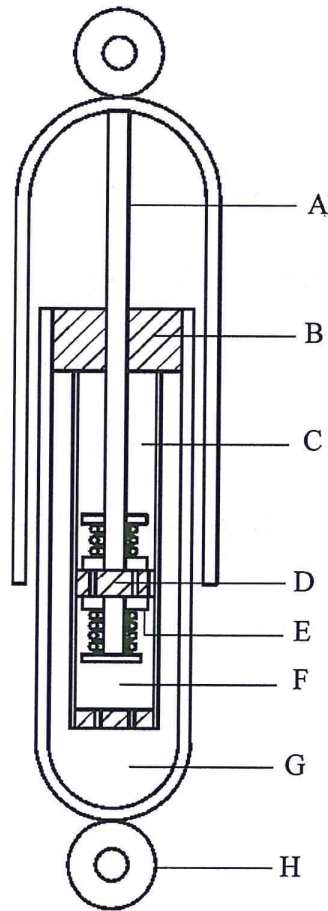


Figure 3

- (a) Name the component and the vehicle system in which it belongs. (1 mark)
- (b) State **two** functions of the component in the vehicle. (2 marks)
- (c) Identify the parts labelled A to H. (4 marks)

A

B

C

D

E

F

G

H

(d) Explain how the component works. (8 marks)

14. (a) (i) Draw a labelled circuit diagram of the starting system of an engine. (6 marks)

(ii) Explain how the system in (a) (i) works. (4 marks)

(b) Outline **five** possible causes of failure of the starting system. (5 marks)

15. (a) Outline **five** functions of the vehicle rear axles. (5 marks)

(b) Explain **two** disadvantages of the conventional differential unit over the modern unit. (4 marks)

(c) Draw a differential lock unit and label **four** parts. (6 marks)

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