

4.3 METALWORK (445)

4.4.1 Metalwork Paper 1 (445/1)

SECTION A (40 marks)

Answer all questions in this section in the spaces provided.

1. (a) Name **two** sectors in the metalwork industry. (1 mark)
- (b) (i) Give **four** levels of training technical personnel. (2 marks)
- (ii) Differentiate between industries in private and public sectors (2 marks)
2. (a) State **two** safety precautions to observe when using each of the following tools: (2 marks)
- (i) Hammer
- (ii) Cold chisel
- (b) Sketch **four** types of cross sections in the manufacture of metal bars. (2 marks)
3. (a) Name **four** tools that can be used for both measuring and checking. (2 marks)
- (b) State **two** care and maintenance practices related to a surface plate. (1 mark)
4. (a) (i) Define the term 'marking out'. (1 mark)
- (ii) Name **two** marking agents. (1 mark)
- (b) State **two** uses of a trammel. (1 mark)
5. With the aid of sketches, differentiate between a countersunk hole and counterbored hole. (2 marks)
6. (a) State the use of each of the following tools: (2 marks)
- (i) Hatchet stake
- (ii) Creasing iron
- (b) Name **four** methods of coating sheet metal. (2 marks)
7. (a) (i) State **four** specifications necessary when ordering general purpose rivets. (2 marks)
- (ii) State the type of rivet recommended for use in sheet metal. (1 mark)

- (b) (i) Define the term 'burnt iron' with respect to soldering. (1 mark)
- (ii) Explain how to correct the problem in 7(b) (i). (2 marks)
8. (a) State **two** safety precautions to be observed when arc welding a work piece. (2 marks)
- (b) Define the following terms as applied in lathe work: (3 marks)
- (i) Parallel turning
- (ii) Facing
- (iii) Knurling.
9. (a) Explain the term "point of decalescence" as applied in heat treatment of metals. (1 mark)
- (b) Name **two** factors to be considered when tempering steel. (2 marks)
10. (a) Define the term forging as used in metalwork. (1 mark)
- (b) State the functions of each of the following parts of an anvil: (2 marks)
- (i) Hardie hole
- (ii) Punch hole
- (c) State **four** methods of finishing metal articles to prevent them from rusting. (2 marks)

SECTION B (60 marks)

Answer question 11 on the A3 paper provided 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 1 shows a shaped block drawn in isometric projection.

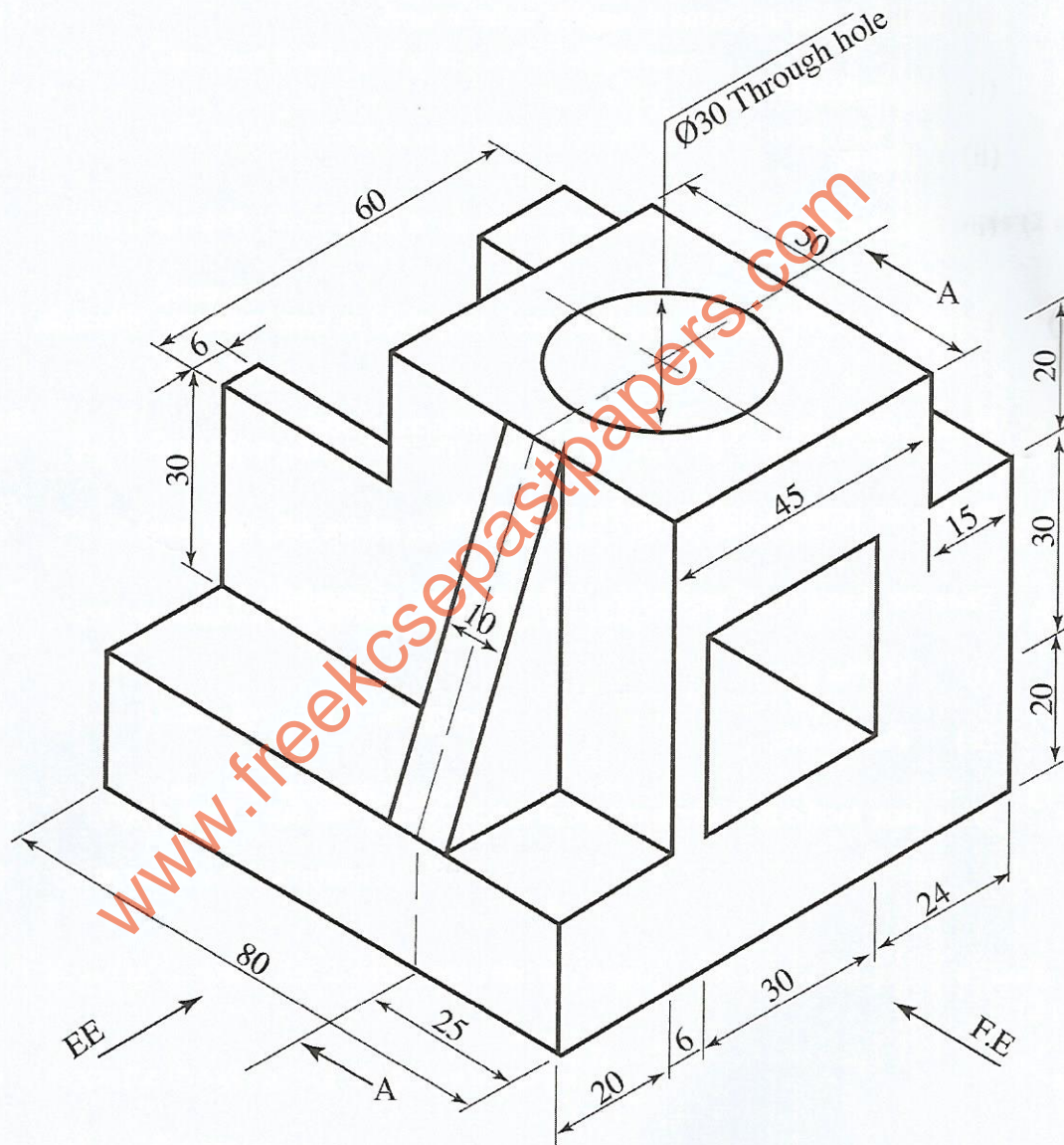


Figure 1

Draw the following views **Full Size** in first angle projection:

(15 marks)

- (a) Sectional front elevation along the cutting plane A-A
- (b) End elevation in the direction of arrow E-E
- (c) Plan

12. (a) Give **four** reasons for applying finishes on metallic articles. (4 marks)
- (b) (i) State **four** properties of cast iron. (2 marks)
- (ii) State **two** factors that make the electric furnace to produce high quality steel. (2 marks)
- (c) Name **four** thread forms and give **one** application of each. (4 marks)
- (d) Use a sketch to show a riveted double cover plate butt joint. (3 marks)
13. (a) Outline the procedure of each of the following processes:
- (i) Tinning a soldering bit (4 marks)
- (ii) Sweat soldering a joint (5 marks)
- (b) State the precautionary measures that should be taken in order to achieve a good soldered joint. (6 marks)
14. **Figure 2** shows a mild steel collar bush to be made on a lathe machine.

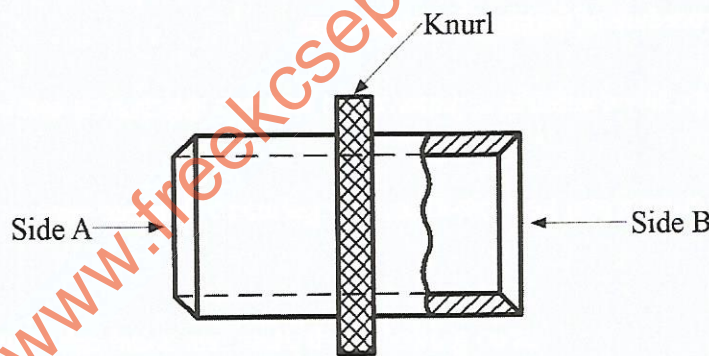


Figure 2

- (a) Outline the procedure of making the bush. (9 marks)
- (b) Outline the procedure of case-hardening the bush. (6 marks)

15. **Figure 3** shows a container made from galvanized sheet metal.

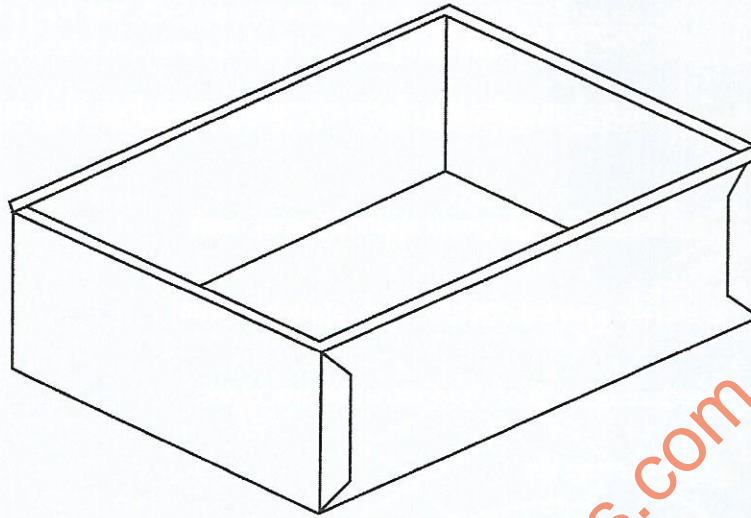


Figure 3

- (a) Draw the surface development of the container. (8 marks)
- (b) Give **two** reasons for making the wired edge on the container. (2 marks)
- (c) Outline the procedure of making the wired edge. (5 marks)