3.17 METALWORK (445)

3.17.1 Metalwork Paper 1 (445/1)

SECTION A (40 marks)

*Answer **all** questions in this section in the spaces provided.*

1. State **four** factors that one should consider when choosing a career. (2 marks)

2. (a) Outline **four** factors that would help an entrepreneur to decide on the type of metalwork business to establish. (2 marks)

   (b) State **four** factors to be considered when tempering steel. (2 marks)

3. (a) State **four** safety precautions to be observed in a metal workshop. (2 marks)

   (b) (i) Name **one** solvent commonly used in paints. (1 mark)

   (ii) State **two** functions of solvents in paints. (2 marks)

4. (a) Outline **two** factors to consider when planning and designing a metallic component. (1 mark)

   (b) State **four** pieces of information included in a cutting list. (2 marks)

5. **Figure 1** shows two metal pieces joined together, leaving a gap marked **X.**

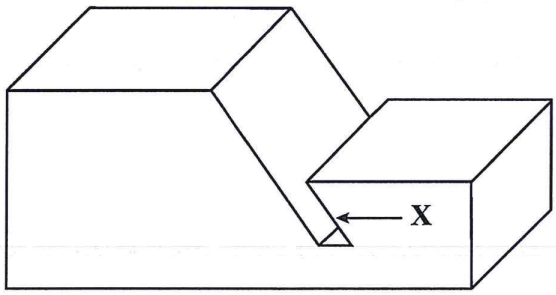

Figure 1

Outline the procedure of determining the size of the gap. (3 marks)

6. (a) Name **three** tools used with a surface plate stating **one** function of each. (3 marks)

   (b) State the function of each of the following parts of a lathe machine. (3 marks)

   (i) Carriage wheel

   (ii) Cross-slide wheel

   (iii) Half-nut lever

7. (a) Give **one** reason why each of the following dies would be preferred over the others: (3 marks)

(i) Split die

(ii) Solid die

(iii) Two piece die

(b) Use a sketch to show how strength of a butt joint can be increased when brazing. (2 marks)

8. (a) Define the term "notching" as used in sheet metalwork. (1 mark)

(b) State **two** reasons for notching. (1 mark)

(c) State **one** factor that determines the size on an overlap when joining metals. (1 mark)

9. (a) Outline the steps to be followed when drilling a pair of plates for riveting. (3 marks)

(b) Explain each of the following terms as used in forging: (3 marks)

(i) Piping

(ii) Necking

(iii) Hardie

10. Give **three** reasons for each of the following: (3 marks)

(a) Using proper clothing when arc welding.

(b) Checking the surface after laying the first bead in arc welding.

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 **two** orthographic views of a block drawn in first angle projection.

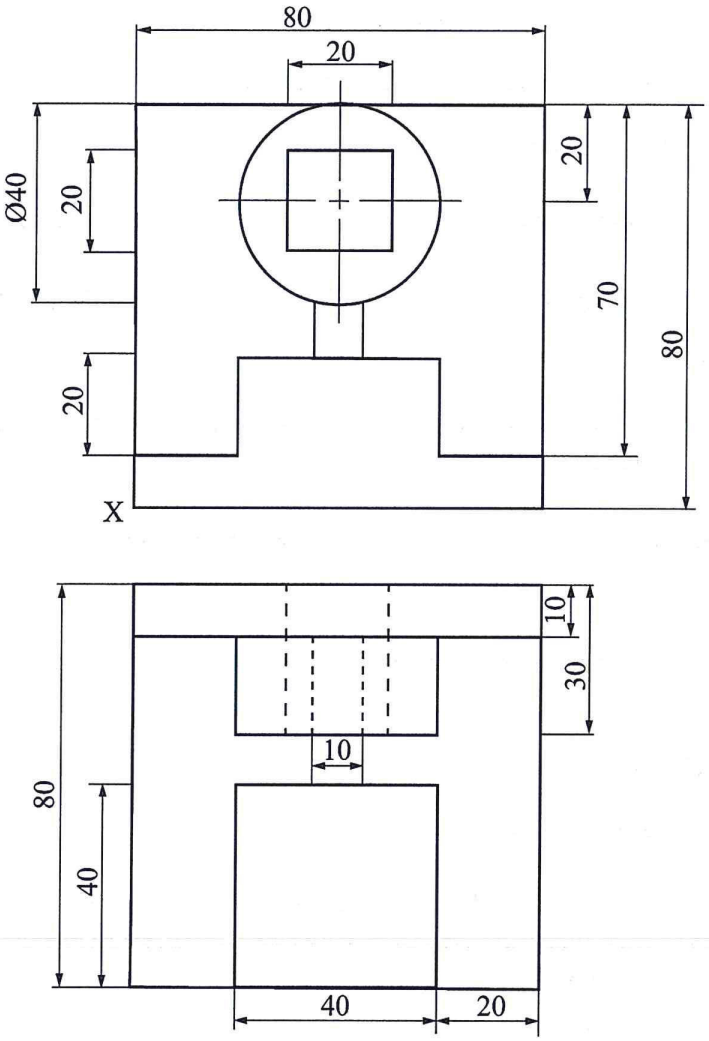

Figure 2

Draw the block **Full Size** in isometric projection, taking X as the lowest point. (15 marks)

12. (a) With the aid of sketches, describe **four** types of pattern developments. (12 marks)

(b) Outline **three** main points to note when developing patterns. (3 marks)

13. (a) State the material to be used to rivet a pan made of aluminium, stating the reason for the choice. (1 mark)

(b) Two mild steel plates, 3 mm thick are to be joined using mild steel rivets. Determine each of the following: (6 marks)

(i) The rivet shank diameter.

(ii) The projection allowance required to form a snap head.

(iii) The distance between the edge of the plate and hole centre.

(iv) The distance between two rivets.

(c) Use sketches to show **four** types of defects which may occur during riveting. (8 marks)

14. (a) Using a sketch, describe how the flame should be applied to the point of a cold chisel when tempering. (6 marks)

(b) With the aid of a sketch, show how a hardened and tempered tool can be tested before putting it into use. (6 marks)

(c) Outline **three** methods used to check the correct temperature when hardening steels. (3 marks)

15. (a) With the aid of sketches, describe each of the following methods of arc welding. (8 marks)

(i) Leftward welding

(ii) Rightward welding

(b) Give **three** common methods used in each of the following weld tests: (3 marks)

(i) Non-destructive

(ii) Destructive

(c) State **four** advantages of using rightward welding method. (4 marks)