3.18 METALWORK (445)

3.18.1 Metalwork Paper 1 (445/1)

SECTION A (40 marks)

Answer all questions in this section in the spaces provided.

1. (a) Define the term "entrepreneur". (1 mark)
   (b) Name two business opportunities in the field of metalwork. (2 marks)

2. (a) State two causes of burns in a workshop. (1 mark)
   (b) Outline two safety precautions to be observed during heat treatment of steel. (2 marks)

3. (a) State four factors to consider when choosing the shape of rivet head to use for riveting. (2 marks)
   (b) State three factors to consider when selecting spelter for brazing. (3 marks)

4. Illustrate two possible faults which may occur when drilling holes for riveting and state the cause of each. (4 marks)

5. State one property and one use of each of the following metals: (6 marks)
   (a) Aluminium alloys
   (b) Copper
   (c) Mild steel
   (d) Cast Iron

6. Using a sketch, show the safe edge of a file in use. (4 marks)

7. With the aid of sketches, illustrate three types of dimensions which can be taken using a vernier calliper. (3 marks)

8. (a) Name four methods of holding work on a lathe machine. (2 marks)
   (b) State the function of each of the following parts of a lathe machine: (3 marks)
      (i) Bed.
      (ii) Carriage.
      (iii) Headstock.
9 (a) State two reasons for finishing metal workpieces.
(b) Name two types of finishes applied on metallic surfaces.

10 State one use of each of the following tools in sheet metalwork.
   (a) Bick
   (b) Funnel stake
   (c) Half moon stake
   (d) Soft Hummers

(2 marks) (1 mark) (4 marks)
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 1 shows two views of a shaped block drawn in 3rd angle projection.

![Figure 1](image)

Draw the block full size in isometric projection with X as the lowest point. (15 marks)

12  (a)  State two safety precautions to be observed when turning between centres on a lathe machine. (2 marks)

(b)  Outline four factors which determine the rate of material removal during lathe operations. (6 marks)

(c)  Outline the procedure of drilling a hole at the end of a round bar or a lathe machine. (5 marks)

(d)  State two limitations of using a three jaw chuck. (2 marks)
13  (a) With the aid of sketches, describe each of the following welding defects:  
(i) Lack of fusion  
(ii) Porosity  
(iii) Poor penetration  
(iv) undercut  

(b) Explain two possible causes of each of the defects in 13(a).  

(c) State the effects of the defects in each case.  

(d) State one general and common cause of welding defects.  

14  Figure 2 shows a template to be made from a mild steel plate 100 mm 3 50 mm 3 5 mm.  

Outline the procedure of making the template, indicating all the tools and equipment used in each step.  

15  (a) Sketch a “vee” screw thread and label all the parts.  

(b) Name and sketch three types of taps which make a set.  

(c) State two possible faults which may occur on a threaded hole.  

(d) State two uses of oil when cutting threads.