

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. (2 marks)
- (b) Name **two** types of finishes applied on metallic surfaces. (1 mark)
- 10 State **one** use of each of the following tools in sheet metalwork. (4 marks)
- (a) Bick
- (b) Funnel stake
- (c) Half moon stake
- (d) Soft Hummers

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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.

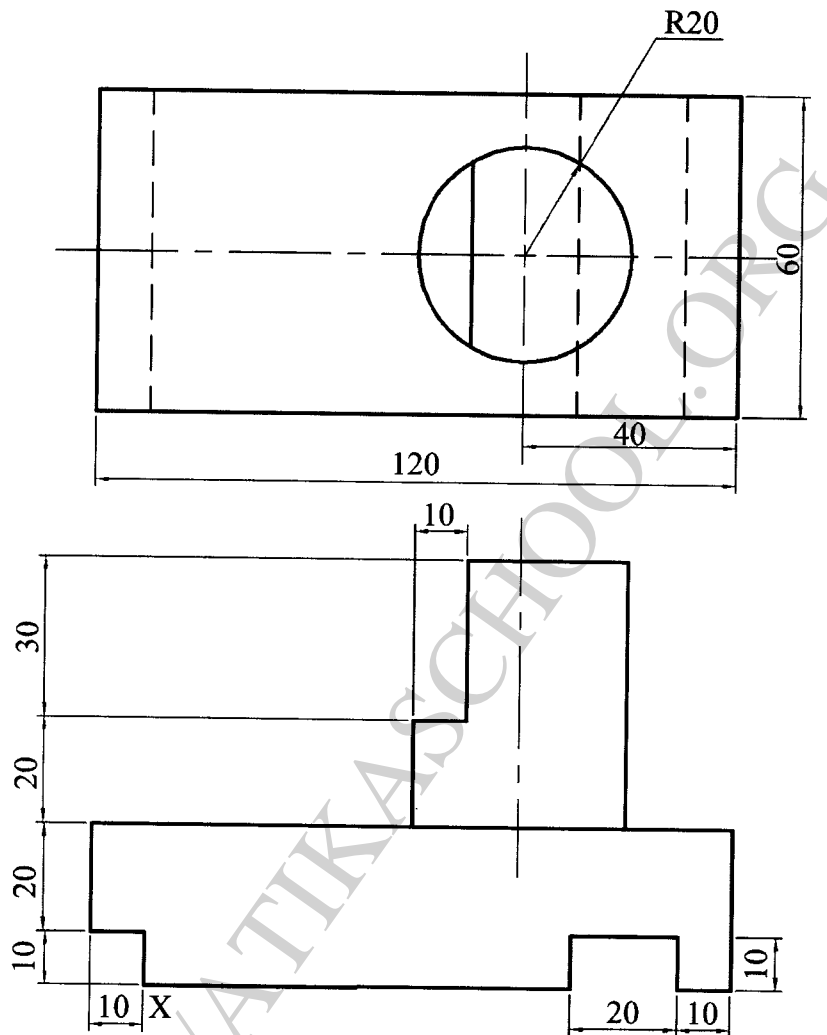


Figure 1

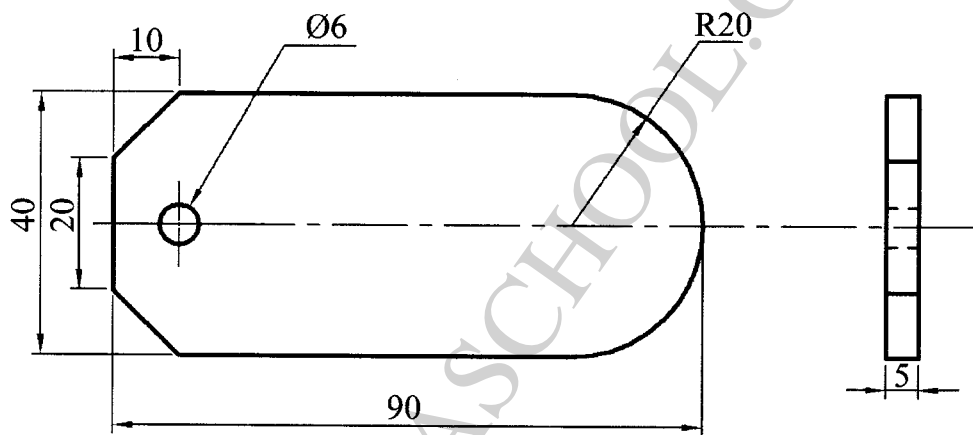
Draw the block **full size** in isometric projection with **X** as the lowest point. (15 marks)

- 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: (6 marks)
- (i) Lack of fusion
 - (ii) Porosity
 - (iii) Poor penetration
 - (iv) undercut
- (b) Explain **two** possible causes of each of the defects in 13(a). (4 marks)
- (c) State the effects of the defects in each case. (4 marks)
- (d) State **one** general and common cause of welding defects. (1 mark)

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



Outline the procedure of making the template, indicating all the tools and equipment used in each step. (5 marks)

- 15 (a) Sketch a “vee” screw thread and label all the parts. (6 marks)
- (b) Name and sketch **three** types of taps which make a set. (6 marks)
- (c) State **two** possible faults which may occur on a threaded hole. (2 marks)
- (d) State **two** uses of oil when cutting threads. (1 mark)