

4.3 METALWORK (445)

4.3.1 Metalwork Paper 1 (445/1)



MANYAM FRANCHISE
Discover! Learn! Apply

SECTION A (40 marks)

Answer all the questions in this section.

- 1 (a) State **one** reason for teaching metalwork at secondary school level. (1 mark)
- (b) List **four** components of a business plan. (2 marks)
- 2 (a) State **four** safety precautions to be observed when using bench shears in a workshop. (2 marks)
- (b) Explain the importance of technical drawing in metalwork industry. (1 mark)
- 3 (a) (i) Sketch and label an odd-leg calipers. (3 marks)
- (ii) State **two** uses of an odd-leg calipers. (3 marks)
- (b) State **five** uses of the square head of a combination set. (2½ marks)
- 4 (a) Name **three** types of snips used in sheet metal and state the use of each. (3 marks)
- (b) (i) State **four** specifications to be considered when purchasing a rivet. (2 marks)
- (ii) Sketch a bifurcated rivet and state one use of the rivet. (1 mark)
- 5 (a) For each of the following items, name the material used and state one property of the material:
- (i) ball peen hammer head; (1 mark)
- (ii) twist drill bit; (1 mark)
- (iii) body of an aircraft. (1 mark)
- (b) List **five** methods of finishing metal articles. (2½ marks)
- 6 (a) Explain the term “file cut”. (1 mark)
- (b) Name and sketch **two** types of file cuts. (2 marks)
- 7 (a) State **two** disadvantages of cooling a brazed joint rapidly. (2 marks)
- (b) Explain the reason for tempering a cutting tool and outline the procedure of tempering. (3 marks)

- 8 (a) Explain **one** advantage of a forged hole over a drilled hole. (1 mark)
- (b) Use a sketch to show the effect on the grain structure of a forged hole and a drilled hole. (2 marks)
- 9 Use labelled sketches to show the following operations on a lathe machine:
- (a) parallel turning; (1 ½ marks)
- (b) facing off. (1 ½ marks)
- 10 Explain each of the following terms as applied in arc-welding:
- (a) scratching; (1 mark)
- (b) tapping; (1 mark)
- (c) freezing. (1 mark)

SECTION B (60 marks)

Answer question 11 and any other three questions from this section. Candidates are advised to spend not more than 25 minutes on question 11.

- 11 **Figure 1** shows a truncated pipe of diameter 24 mm. Draw the development of part B. (15 marks)

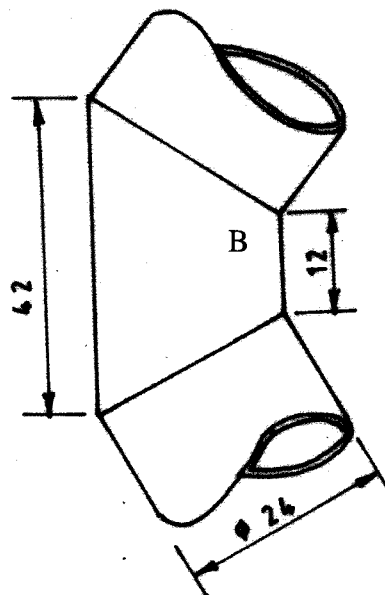


Fig. 1

(Use A3 paper provided)

12 Figure 2 shows an arc welding set-up.

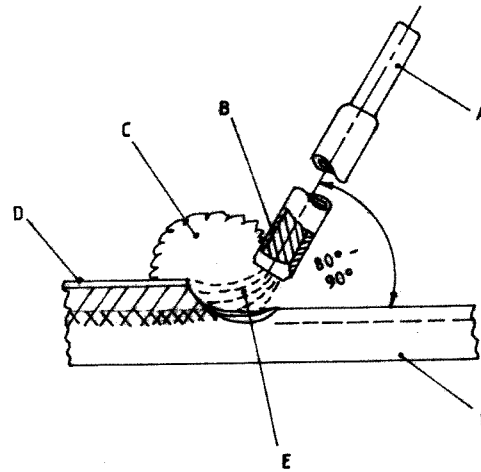


Fig. 2

- (a) (i) Name the parts labelled A, B, C, D, E and F. (3 marks)
- (ii) State the function of each of the following parts:
- B;
C;
D. (3 marks)
- (b) With reference to arc welding;
- (i) Define the term bead; (1 mark)
- (ii) Outline the procedure of starting a bead. (5 marks)
- (c) Use sketches to show the following defects in arc welding and state **one** cause of each. (3 marks)
- (i) undercut;
- (ii) porosity.

13 Figure 3 shows a drawing of a lathe machine.

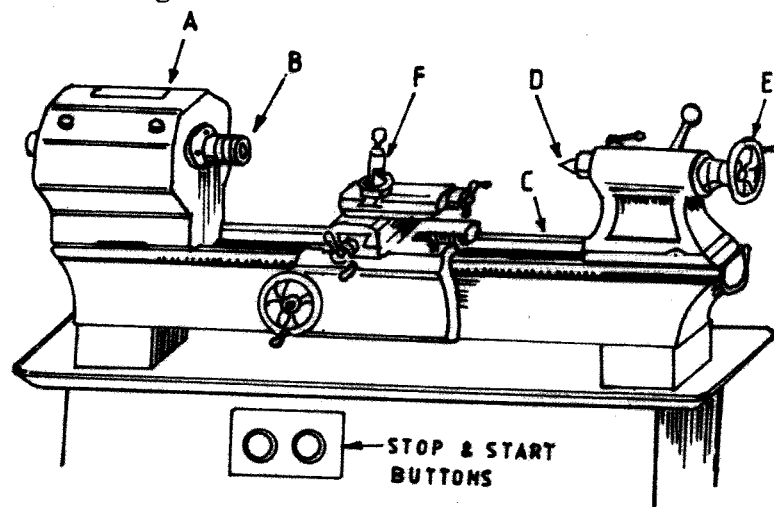


Fig. 3

- (a) Name the parts labelled A, B, C, D, E and F and state **one** function of each part. (9 marks)

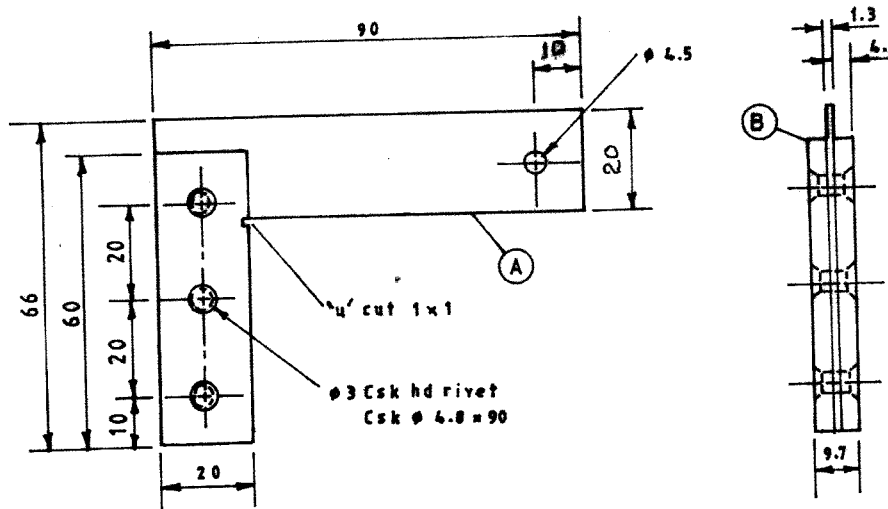
(b) State and explain **four** factors which determine the rate of material removal when turning on a lathe. (6 marks)

14 With the aid of sketches, outline the steps followed in making a grooved seam joint of an open cylinder and name **two** tools used in each case. (15 marks)

15 (a) State **four** possible causes for each of the following:

- (i) drill bit breakage; (2 marks)
- (ii) weak riveted joint. (2 marks)

(b) **Figure 4** shows a working drawing of an engineer's try-square drawn in first angle projection.



Given the cutting list below, outline the procedure of making the try-square.

PART	NO. OFF	LENGTH (mm)	WIDTH (mm)	THICKNESS (mm)	MATERIAL
Stock (B)	2	63	22	4.5	BDMS
Blade (A)	1	95	70	1.5	BDMS
Rivets	3	14.5	-	Ø3	BDMS

(11 marks)