4.9 DRAWING AND DESIGN (449)

4.9.1 Drawing and Design Paper 1 (449/1)

SECTION A (40 marks)

*Answer **all** the questions in this section on the answer sheets provided.*

1 (a) State **two** requirements to be observed to avoid confusing the dimension lines with outlines in a drawing. (1 mark)

(b) Give **two** reasons why care must be taken when storing drawing instruments. (2 marks)

2 (a) State what an industrial training centre in Kenya is. (1 mark)

(b) State **two** factors to consider in order to produce quality drawing. (1 mark)

3 (a) State **four** ways through which design ideas are communicated. (2 marks)

(b) Sketch the convention for each of the following:

(i) circular tube;
(ii) planed timber;
(iii) switch;
(iv) knurling. (2 marks)

4 (a) Give the composition of each of the following alloys:

(i) brass;
(ii) Stainless steel. (2 marks)

(b) **Figure 1** shows a machine component. (2 marks)

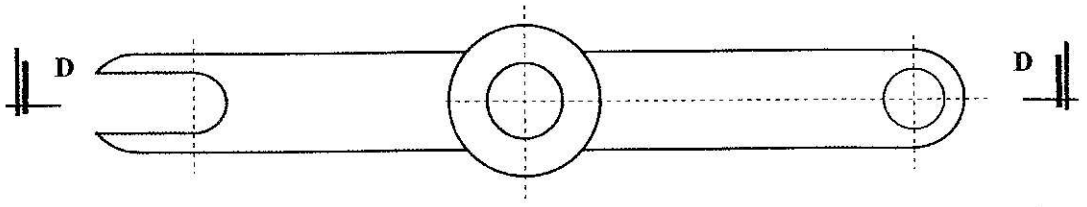


Figure 1

Draw the section D-D.

5 (a) (i) Explain each of the following scales in relation to the size of the drawing and the actual object.

(I) 20:1
(II) 1:20

(ii) Give a common example where each of the above scales would be used. (3 marks)

(b) For the template shown in **Figure 2**.

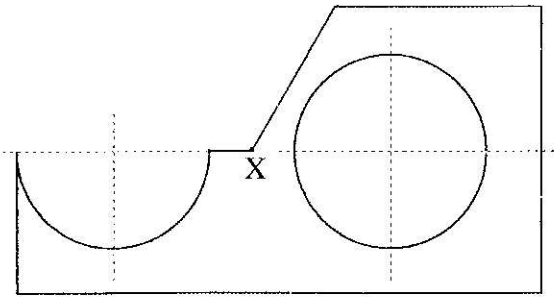


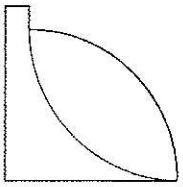
Figure 2

Measure and dimension the following:

(i) the semi circle;
(ii) the angle at point X. (2 marks)

6 Use labelled sketches to differentiate between one-point and two-point perspective drawings. (2 marks)

7 **Figure 3** shows two views of a block drawn in first angle projection.



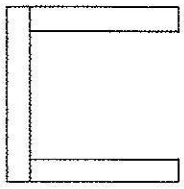


Figure 3

Sketch in good proportion, the oblique view of the block. (3 marks)

8 Construct a triangle whose perimeter is 240 mm and the sides are in the ratios 4.5:6.0:7.5 measure the smallest angle. (4 marks)

9 (a) **Figure 4** shows two views of a machined bracket drawn in first angle projection.

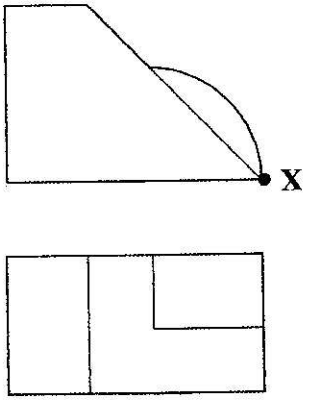


Figure 4

Sketch in good proportion, the isometric view of the block taking **X** as the lowest point. (3 marks)

(b) **Figure 5** shows a truncated triangular prism drawn in first angle projection.

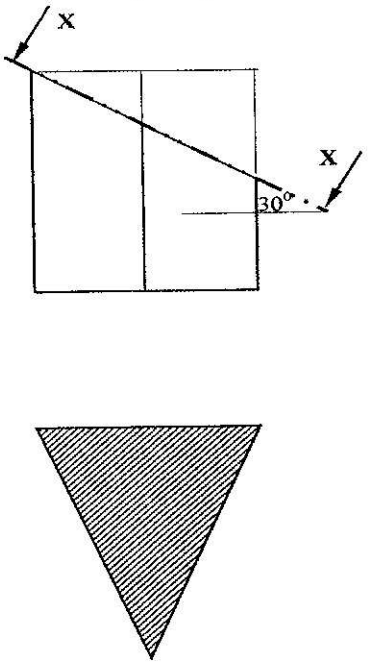


Figure 5

Draw the end elevation. (4 marks)

10 Sketch in third angle projection the three orthographic views of the block shown in **Figure 6.** (6 marks)

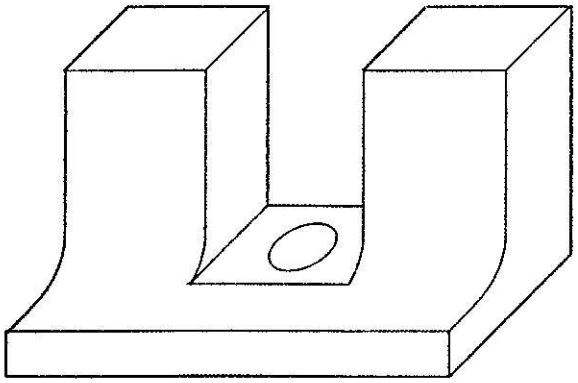


Figure 6

SECTION B (30 marks)

(COMPULSORY)

Candidates are advised to spend ***not more than one hour*** *on this question.*

11 **Figure 7** shows part of a coupling bracket drawn in first angle projection.

Assemble the parts and draw FULL SIZE, the following:

(a) Sectional front elevation along the cutting plane A-A.
(b) End elevation in the direction of arrow B.
Do not show the hidden details.

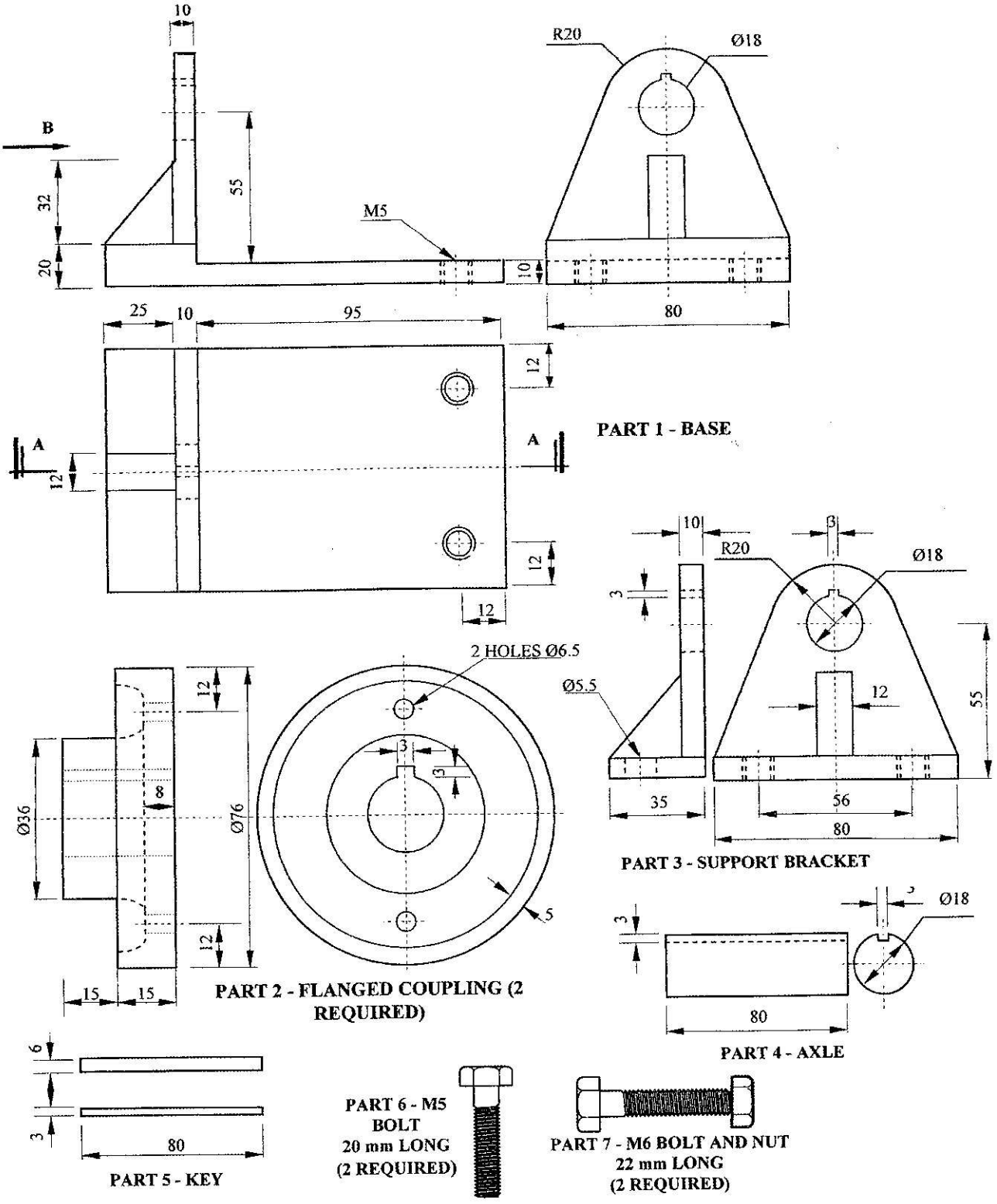
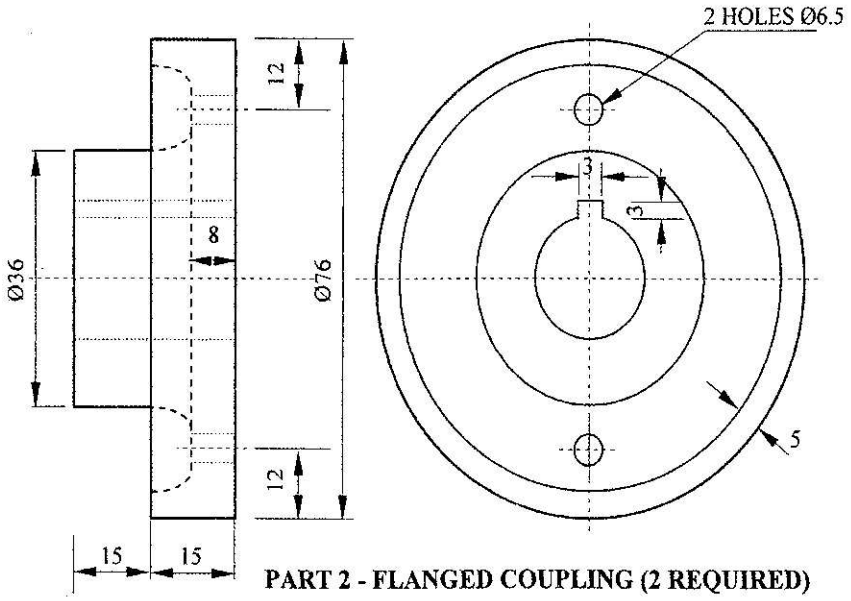
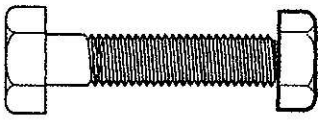

10
R20
Ø18
B
32
20
55
M5
10
80
25
10
95
12
A
A
12
12
12
PART 1 - BASE
10
3
R20
Ø18
3
Ø5.5
12
55
35
56
80
PART 3 - SUPPORT BRACKET
2 HOLES Ø6.5
12
Ø36
8
Ø76
3
3
5
12
15
15
PART 2 - FLANGED COUPLING (2 REQUIRED)
3
Ø18
80
PART 4 - AXLE
6
3
80
PART 5 - KEY
PART 6 - M5 BOLT 20 mm LONG (2 REQUIRED)
PART 7 - M6 BOLT AND NUT 22 mm LONG (2 REQUIRED)

FIGURE 7

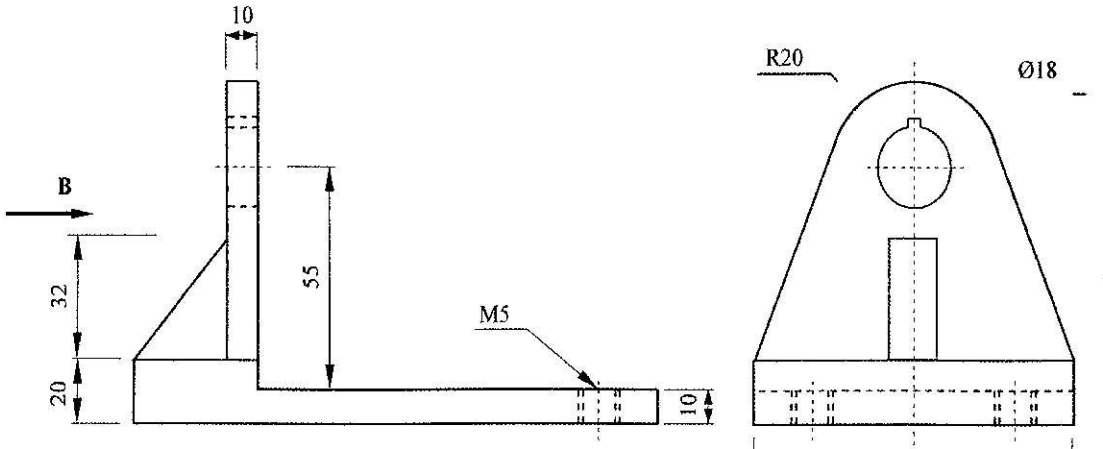


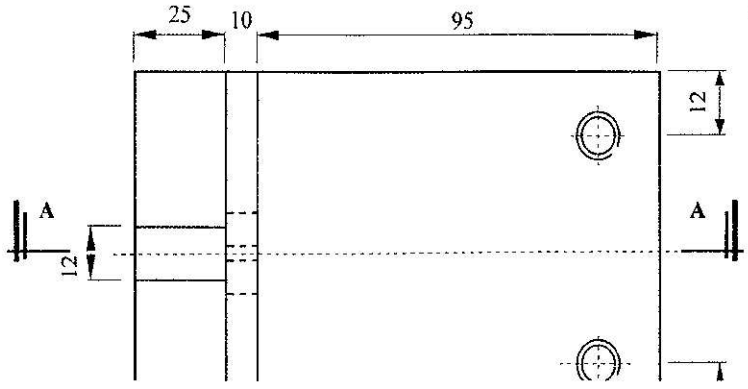
PART 2 - FLANGED COUPLING (2 REQUIRED)



PART 7 - M6 BOLT AND NUT
22 mm LONG
(2 REQUIRED)

PART 6 - M5 BOLT
20 mm LONG
(2 REQUIRED)





PART 1 - BASE

SECTION C (30 marks)

*Answer any **two** questions from this section.*

12 **Figure 8** shows two views of a funnel drawn in third angle projection. The body of the funnel is conical with a wired edge and a cylindrical spout.

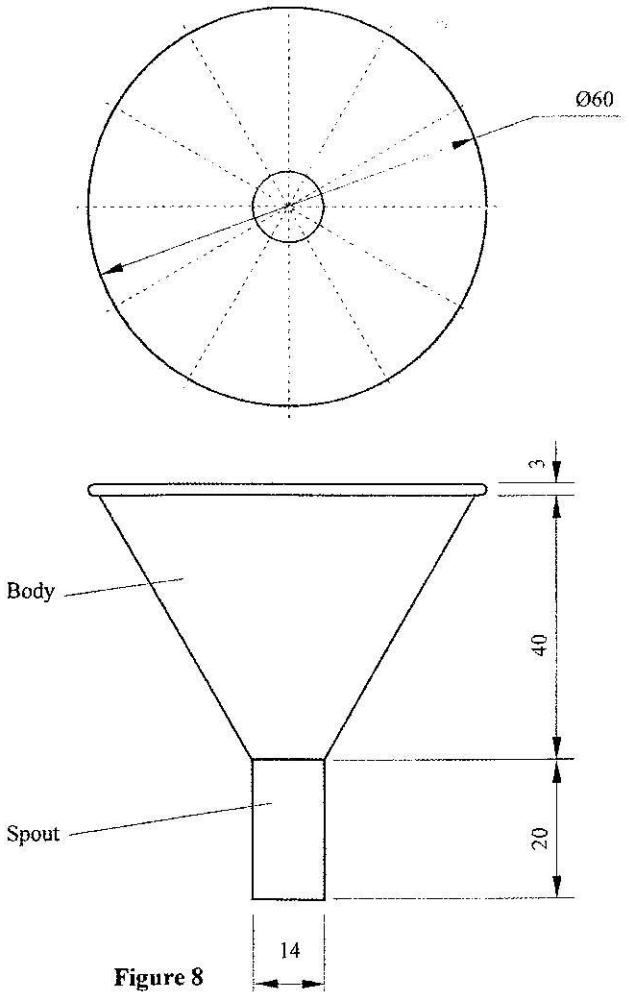


Figure 8

Draw the development of:

(a) the body with a 3 mm wire edge;
(b) the spout (allow 5 mm seam and ignore the thickness of the material). (15 marks)

13 **Figure 9** shows a pictorial view of a machined block.

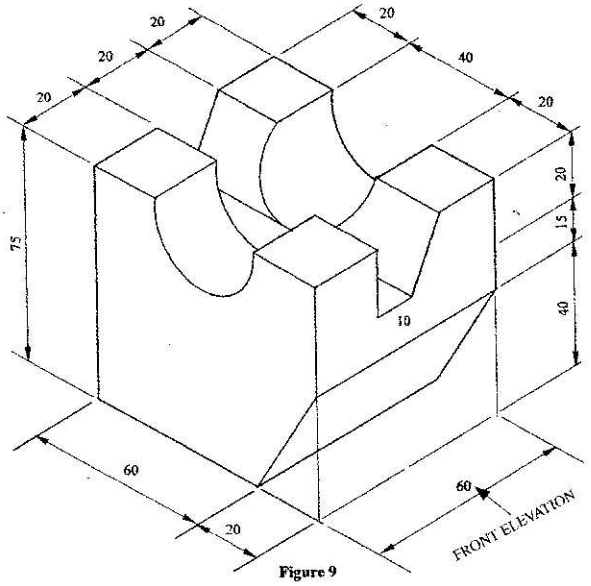


Figure 9

Draw FULL SIZE in third angle projection, the three orthographic views of the block. (15 marks)

14 **Figure 10** shows a plan of a guard house.

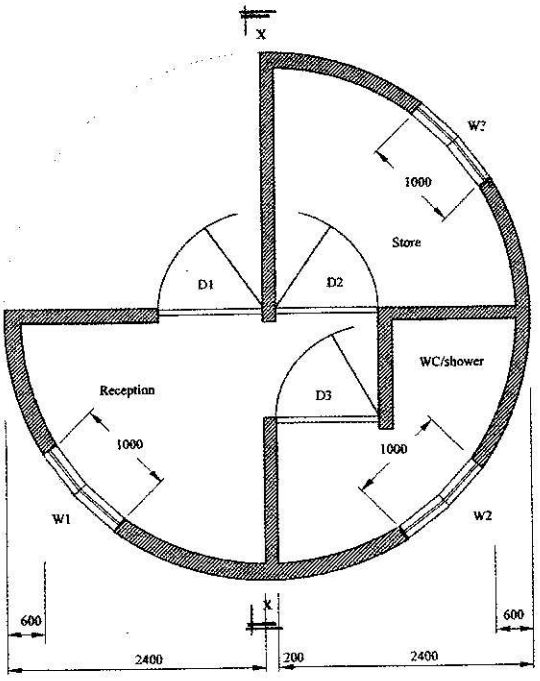


Figure 10

Draw section X-X to a scale of 1:50. (15 marks)

Specifications

Foundation:	Concrete strip 600 x 200
Walling:	200 mm blockwork
Flooring:	Ring beam 300 x 200
Flooring:	Concrete on hardcore
	Screed on 100 mm concrete
Roof:	Pitch 30° covered with concrete tiles on 50 x 25 battens on 100 x 50 rafters.
Doors:	D1 steel casement 2000 x 900
	D2 and D3 framed timber 2000 x 900
Windows:	W1 steel casement 1600 x 1000
	W2, W3 and W4 1000 x 500