

5.7 DRAWING AND DESIGN (449)

5.7.1 Drawing and Design Paper 1 (449/1)

SECTION A

1. (a) Information regarding parastatal organizations in Kenya:

- (i) Ownership
They are largely owned by the government.
- (ii) Management
They are managed by government appointees.
- (iii) Services
They provide subsidized services to the customers who might find it expensive to afford them if they were left to private establishments.

(3 x 1 = 3 marks)

(b) Steps involved in the design process:

- (i) Statement/stating the problem.
- (ii) Recording the design ideas in form of sketches and written notes.
- (iii) Selecting the best solution.
- (iv) Preparing the final drawing or mock-up (model).



(4 x 1 = 4 marks)

2. (a) (i) Reasons for using different types of lines in drawing:

- It makes the drawings neat and legible.
- It makes it easy for the person/people depending on the drawing to interpret the details in the drawing.

(1 x 1 = 1 mark)

(ii) Use of the following lines:

-  centre line denoting:-
 - centre of a circle
 - axis of symmetry
-  phantom to denote:-
 - folding line
 - different possible positions

(2 x $\frac{1}{2}$ = 1 mark)

(b) Advantages of using computers in drawing:

- (i) There is higher speed in production of drawings thus saving time.
- (ii) There is high degree of accuracy.
- (iii) It is easy to retrieve information.
- (iv) It is easier to make alterations on the drawings.
- (v) It allows for interfacing/interlinking.
- (vi) It allows for production of many copies.

(iii) The drawings produced are neat.

(Any 6 x $\frac{1}{2}$ = 3 marks)

1. (a) Disadvantages of using:

- (i) Masking tape to hold paper
 - it tends to peel off part of the paper
- (ii) Thumb pins to hold paper
 - they ruin the surface of the drawing board

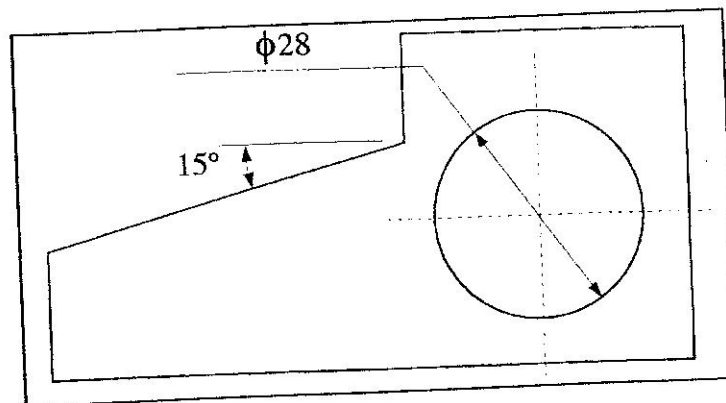
(2 x 1 = 2 marks)

- (b)
- (i) Plywood are manufactured boards made of thin sheets of wood (veneers) that are glued together with the grain of each layer perpendicular to the next.
 - (ii) Chipboard is manufactured by chips of wood which are compressed and glued to the required density.
 - (iii) Blockboards are made up of blocks of timber joined on edge and faced suitably with plywood on both faces.

Sketches to be accepted.

(3 x 1 = 3 marks)

4.

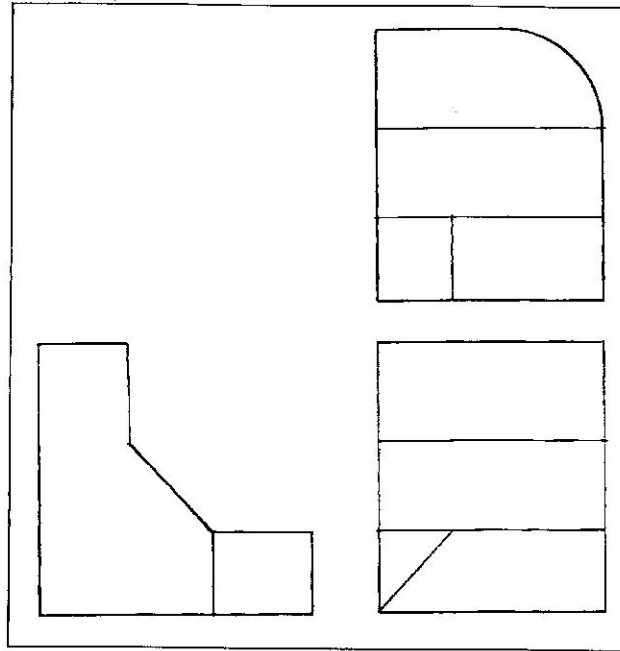


Figure

- Correct $\phi 28$ - $\frac{1}{2}$ mark
- Correct 15° - $\frac{1}{2}$ mark
- Correct arrows² for $\phi 28$ - $\frac{1}{2}$ mark
- Correct arrows for 15° - $\frac{1}{2}$ mark

(2 marks)

5.

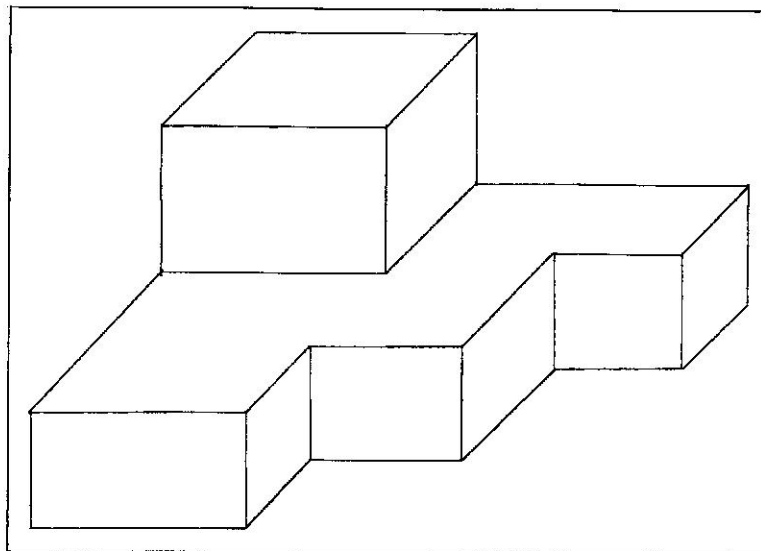


Figure

Plan - 4 faces @ $\frac{1}{2} = 2$
 End elevation - 2 faces @ $\frac{1}{2} = 1$
 Front elevation - 4 faces @ $\frac{1}{2} = 2$
 3rd angle projection = 1 mark

(6 marks)

6.

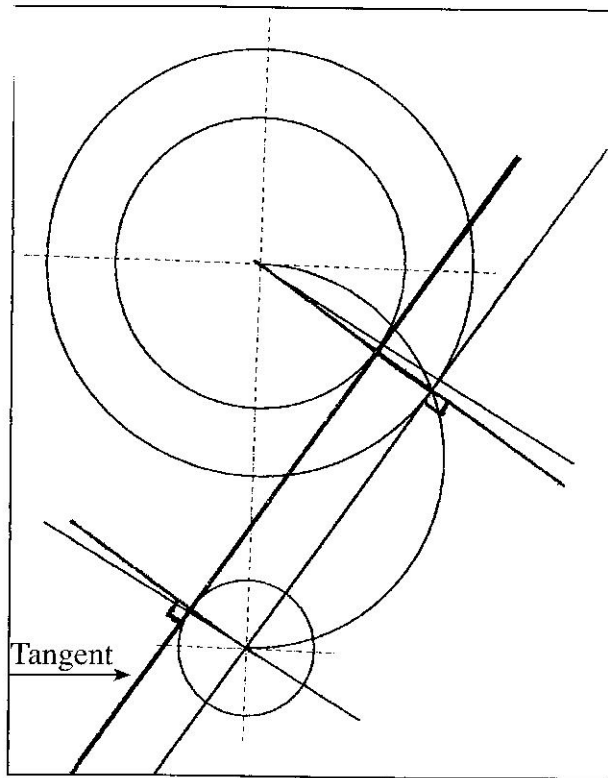


Figure

Oblique projection - 1 mark
 At least 9 faced 9/3 - 3 marks
 Proportionality - 1 mark
 Line mark - 1 mark

(6 marks)

7.



Figure

Construction of:-

Correct circle radius

$R_1 + R_2$ - 2 marks

semi-circle - 2 marks

parallel lines - 2 marks

tangent (shown correctly) - 1 mark

(7 marks)

8. $AB = \text{measured dimension} \times 2$ $60 \times 2 = 120\text{mm}$ $1 \frac{1}{2}$

$CD = \text{measured dimension} \times \frac{1}{2}$ $34 \times \frac{1}{2} = 17\text{mm}$ $1 \frac{1}{2}$

3 marks

OR

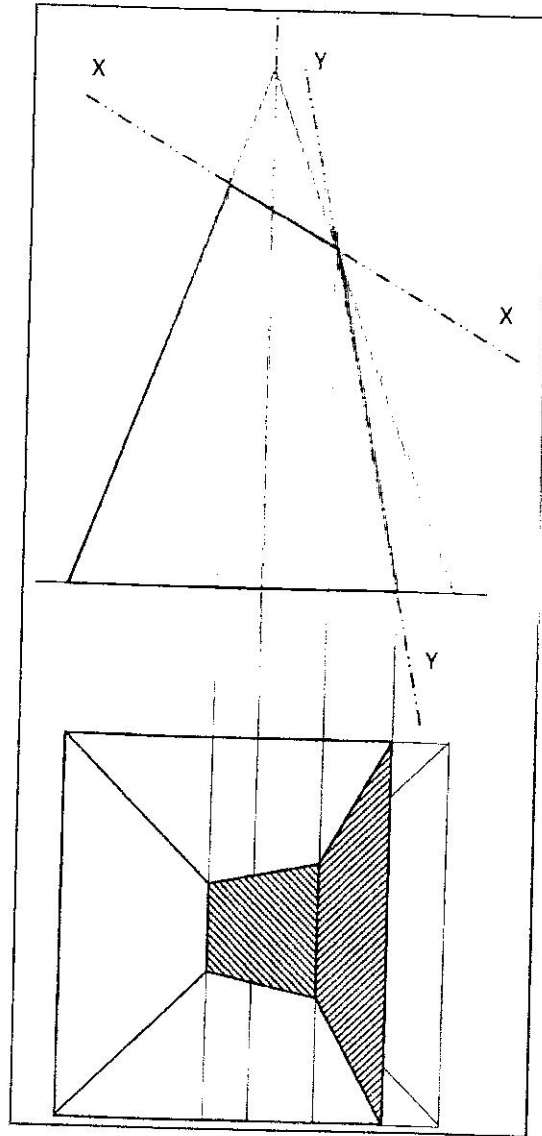
Correct measurements of AB and CD
Determining the distances

$(2 \times \frac{1}{2} = 1 \text{ mark})$

$(2 \times 1 = 2 \text{ marks})$

3 marks

9.



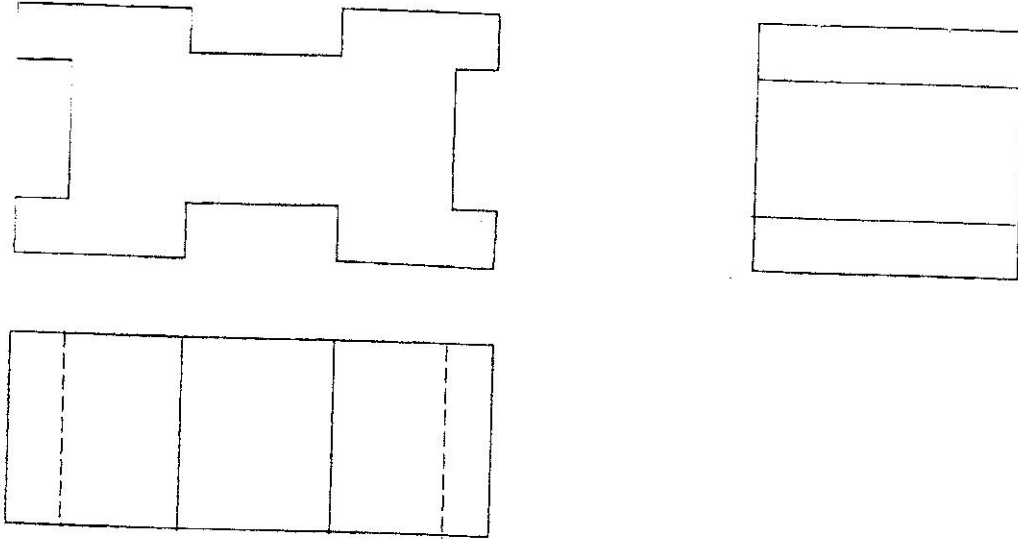
Figure

$$5 \text{ faces} \times \frac{1}{2} = 2\frac{1}{2}$$

$$\text{Hatching } (2 \times \frac{1}{2}) = 1$$

$$\text{Line work} = \frac{1}{2}$$

IND.



Figure

- Vertical projection lines - 1 mark
- Projection lines at 45° - 1 mark
- or by use of compass*
- correct outline - 2 marks
- hidden details - 1 mark

(5 marks)

11.

Section FF

16 faces @ $\frac{1}{4}$ = 4 marks

Hatching 6x1 = 6 marks

Plan

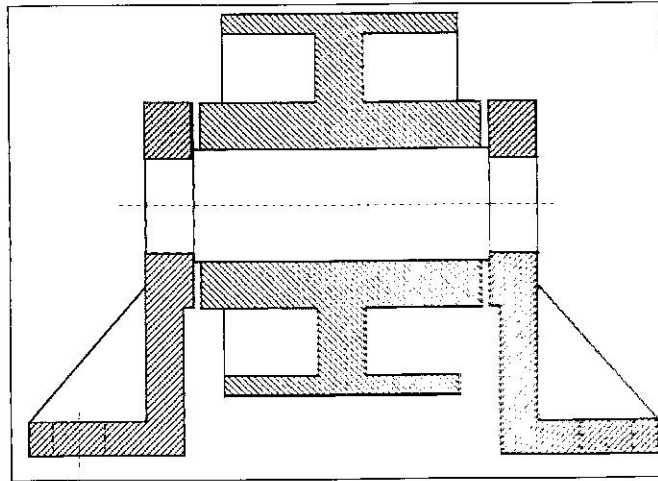
13 faces @ $\frac{1}{2}$ = $6\frac{1}{2}$

4 holes @ $\frac{1}{2}$ = 2

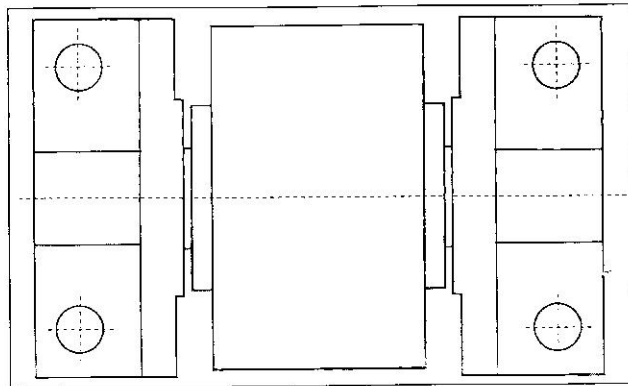
linework = $1\frac{1}{2}$

20 marks

11.

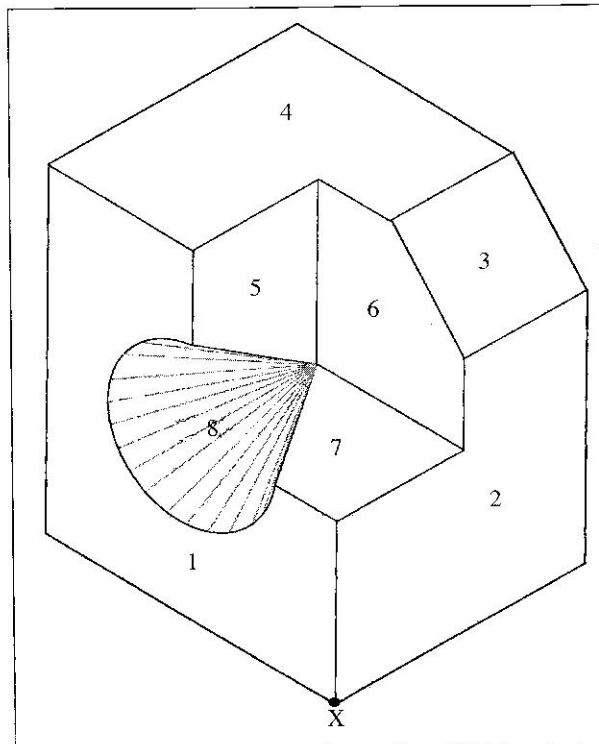


SECTIONAL FRONT ELEVATION ALONG F-F



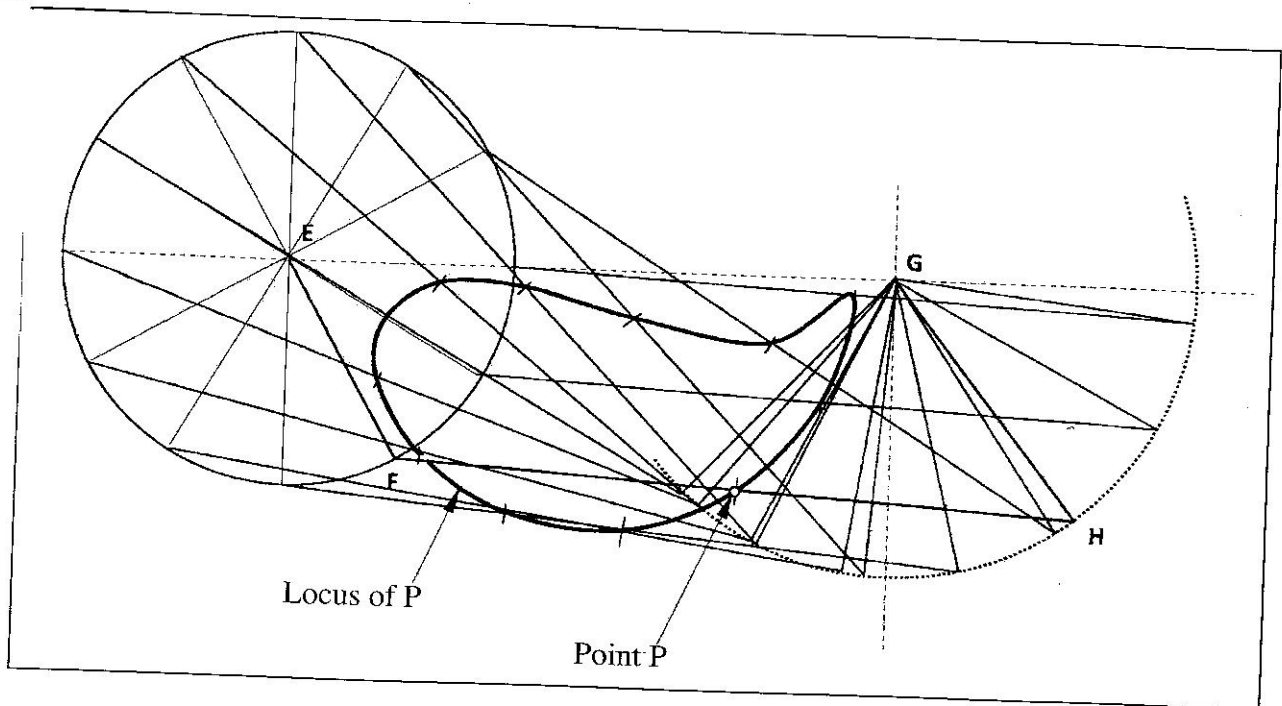
PLAN Figure

12.



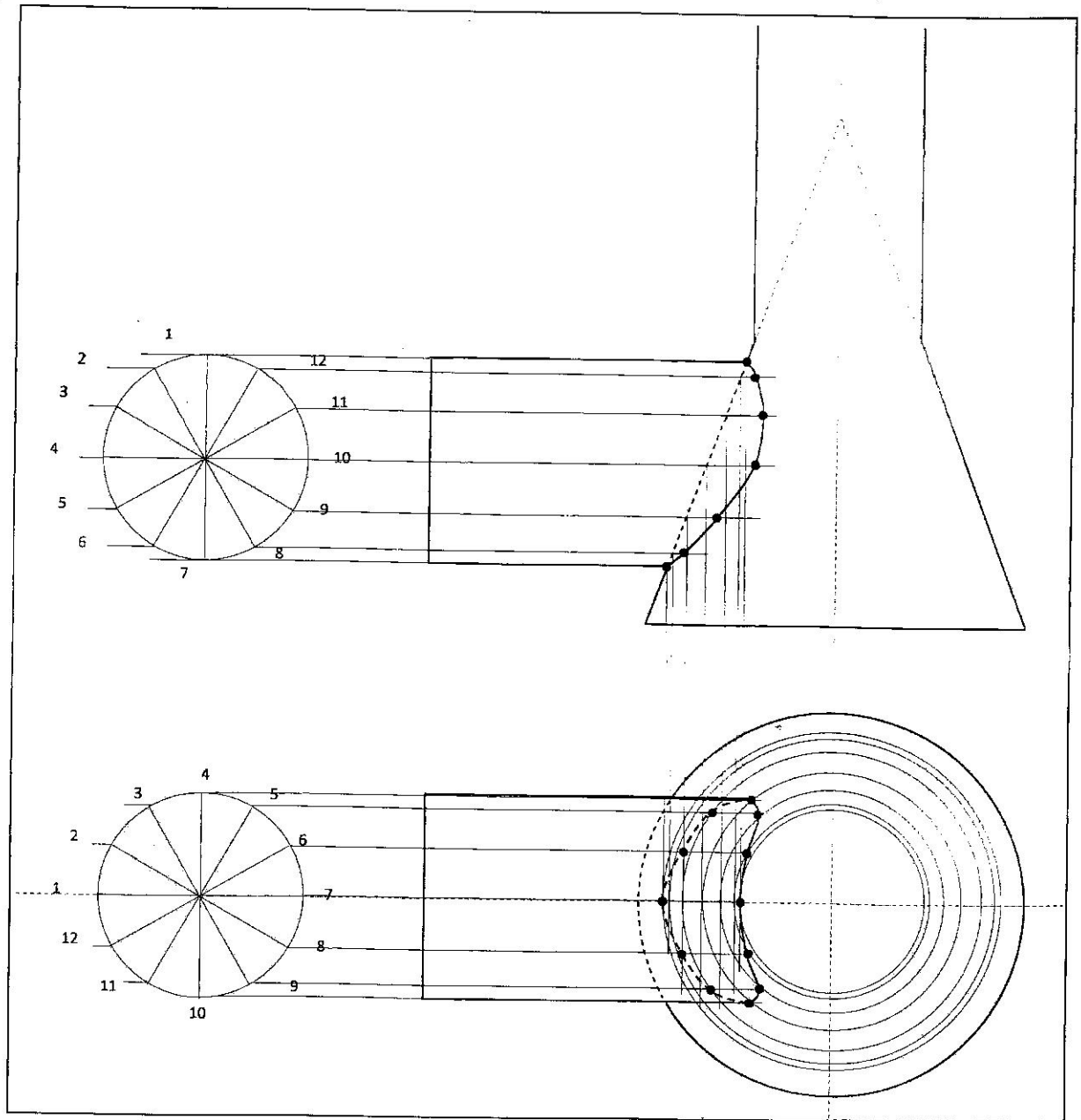
faces $7 \times 1 = 7$
 isometric axis = 1
 low pitch X = 1
 pictorial curve = 2
 conical hole (8) = 2
 scale = 1
 linework = 1
 (15 marks)

13.



copying the figure $(4 \times \frac{1}{2}) = 2$
 locus of F = 1
 division of locus F = 2
 locus of H = 1
 projection to H = 3
 mid-point P = 3
 completing locus of P = 2
 linework = 1
 (15 marks)

14.



drawn elevation = 1

drawn plan = 2

divide pipe in elevation = 1

plot points at intersection of sloping edges = 1

project elevation points to plan = 1

draw circles at intersection of plan points and elevation points = 1

mark curve of interpenetration points of plan = 2

mark points of interpenetration on elevation = 2

draw smooth curve through points of plan;

part full lines; part hidden details = 1

draw smooth curve through points of elevation = 1

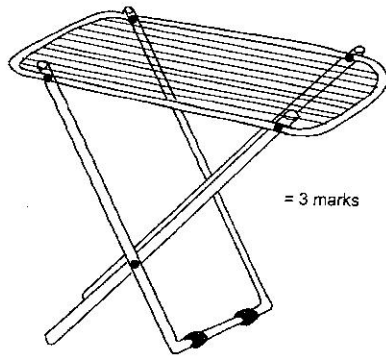
construct lines = 1

outlines = 1

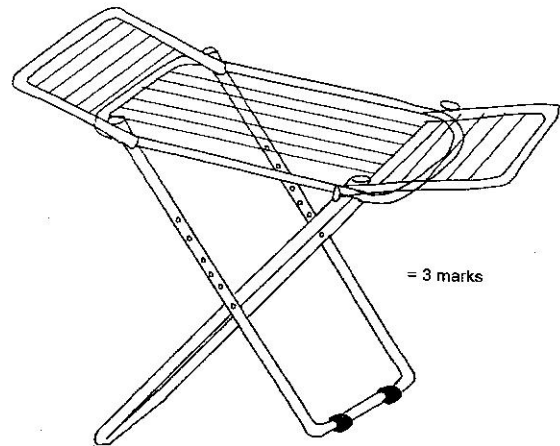
(15 marks)

4.20.2 Drawing and Design Paper 2 (449/2)

a)



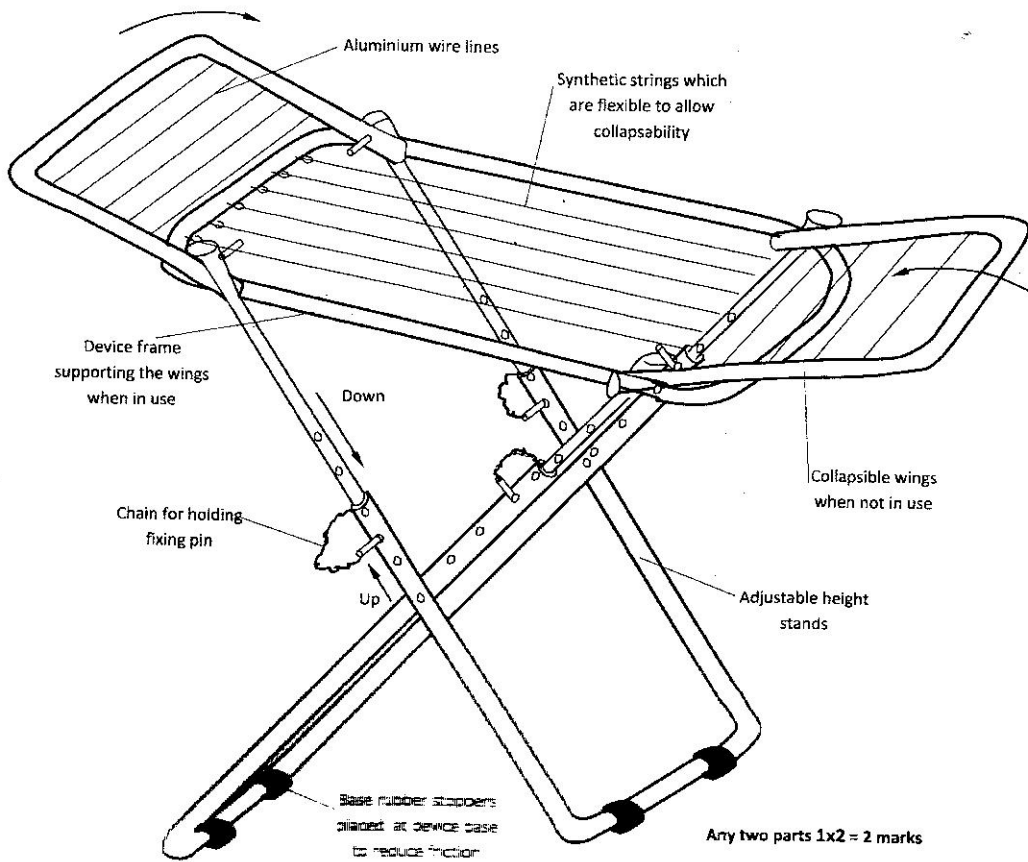
= 3 marks



= 3 marks

Total = 6 marks

b)



Any two parts 1x2 = 2 marks

Pictorial sketch = 14 marks

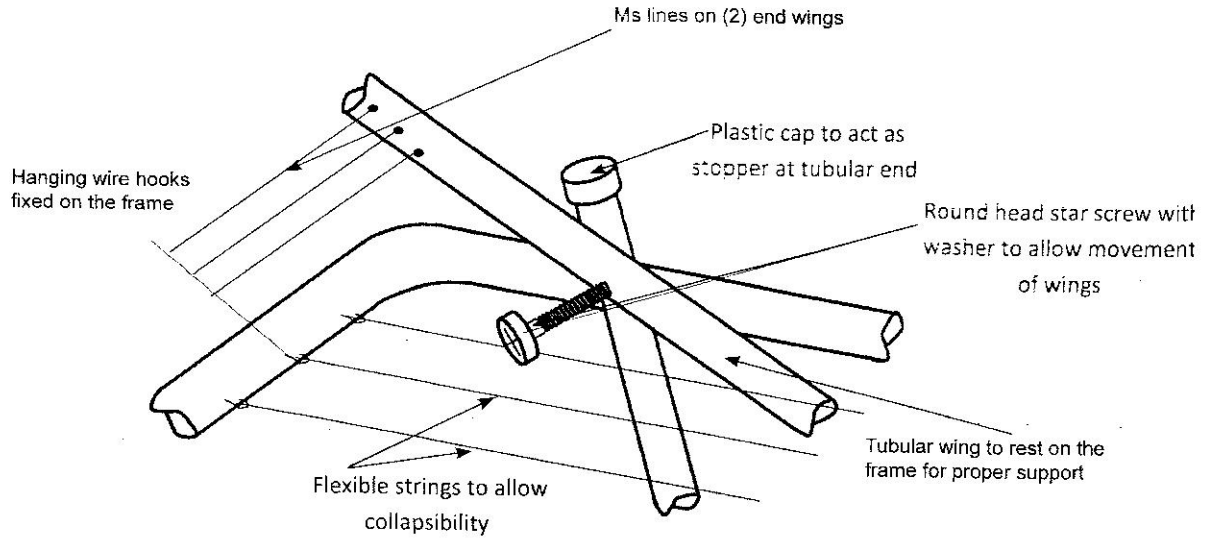
Total = 16 marks

(c)

Consideration i

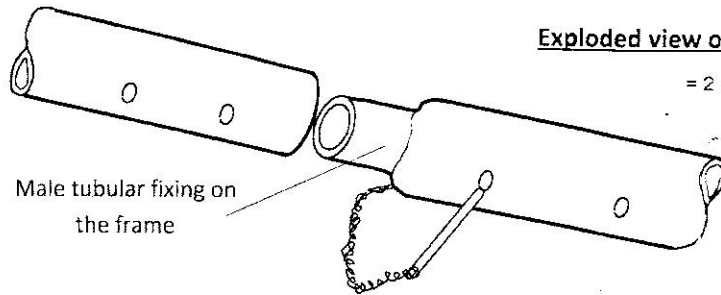
Collapsible wings

= 4 marks



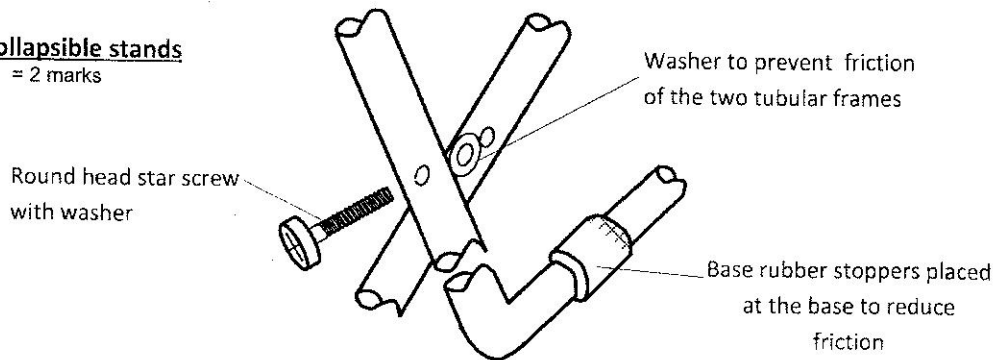
Exploded view of Collapsible side frame

= 2 marks



Collapsible stands

= 2 marks

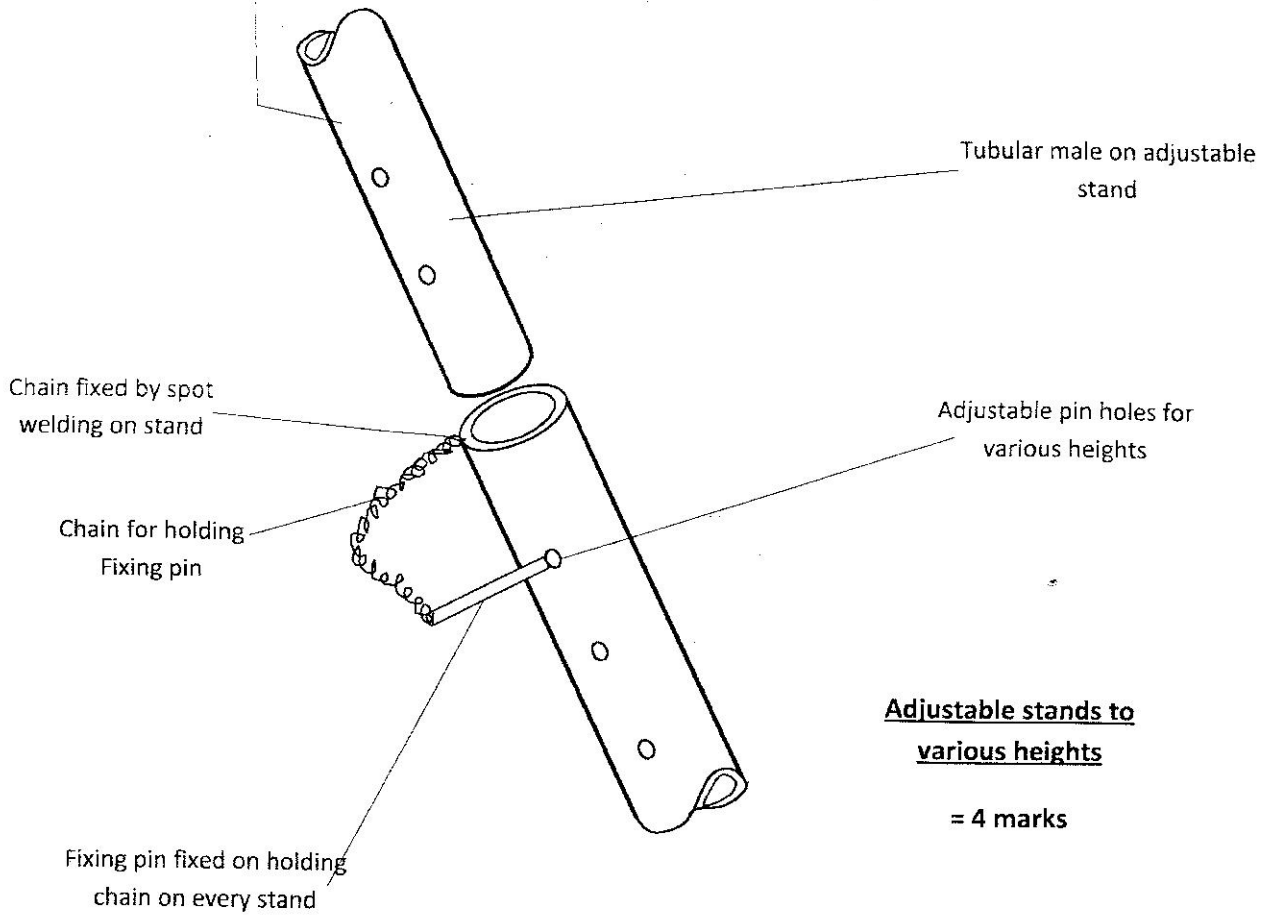


sub total = 8 marks

Consideration iii

Exploded

Adjustable stands to different heights



Adjustable stands to various heights

= 4 marks

Total 8+ 4 = 12 marks

d) MATERIALS USED

- (i) • Aluminium tubular (1 mark)
- Rubber Stoppers (1 mark)

(ii) CHOICE OF MATERIAL

- Aluminium tubular: - light in weight for easy movement. ($\frac{1}{2}$ mark)
- Rubber stoppers: Anti-slip material to reduce friction on the ground when device is at work. ($\frac{1}{2}$ mark)

3 marks

(e) (i) TWO JOINING METHODS

- Riveting - (1 mark)
- Glueing - (1 mark)

(ii) WHERE APPLIED

- Riveting: - At the stands joints and collapsible wing joints. ($\frac{1}{2}$ mark)
- Glueing:- Fixing Rubber stoppers with strong adhesive to the stand base frame when device is at work. ($\frac{1}{2}$ mark)

3 marks

Total = 40 marks