$$i = \frac{es}{Z} \quad \textit{(1 mark)}$$

$$= \frac{es}{\sqrt{R^2 + X^2_c}} \quad \textit{(1 mark)}$$

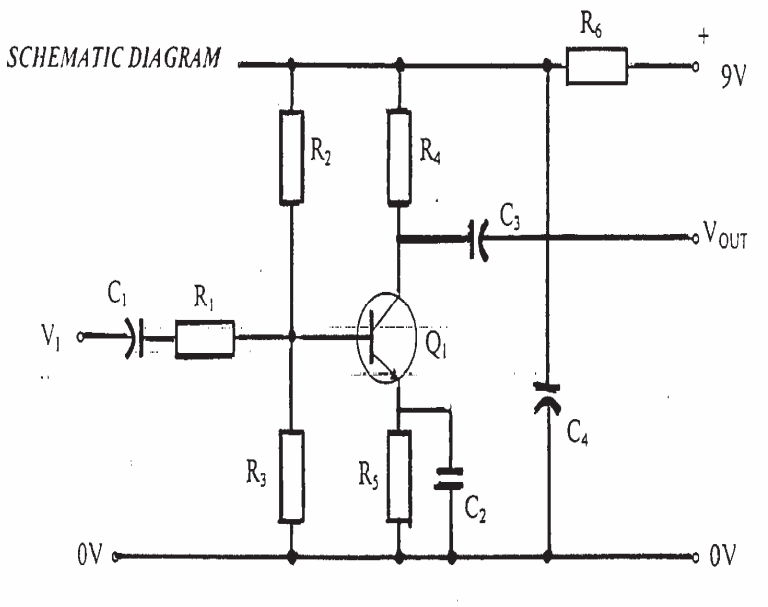
$$= \frac{10}{\sqrt{3^2 + 6^2}} \quad \textit{(1 mark)}$$

$$= i=11.5\text{mA} \quad \textit{(1 mark)}$$

15. (a)

- Draw for schematic diagram of the circuit.
- Draw the PCB artwork.
- Transfer artwork to copper side of the board.
- Etch the board.
- Drill holes for the component.
- Position the components and connectors.
- Solder the components and connectors.
- Dress the PCB that is, cut out the tails and close PCB surface. ***(8x ½ =4 marks)***

(b)



(8 marks)

30.20 DRAWING AND DESIGN (449)

30.20.1 Drawing and Design Paper 1 (449/1)

1. (a) ***Grid paper*** : used in the initial setting of a drawing by tracing. It saves time.
Tracing paper: used for copying or developing existing drawings. It saves time.

(2 ×1=2 marks)

(b) ***Engineer***

- Designs structures and components.

- Makes engineering and management decisions.

Technician

- Implements management and engineering decisions.
- Draughts and details drawings. ***(2 ×1=2 marks)***

2. (a)
   - Identification of needs.
   - Definition of problem.
   - Search for possible solutions.
   - Analysis.
   - Decisions and specifications. ***(Any 3 × ½ =1 ½ marks)***

   (b)
   - North point orientation.
   - Stop valve.
   - Cartridge fuse.
   - Power point. ***(Any 4 × ½ =2 marks)***

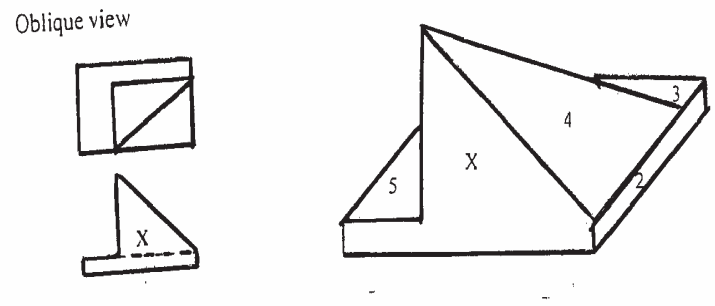
3. (a) ***Soft soldering:*** process of joining thin metal using filler material (solder) that melts at a lower temperature than the parent metal.

   (b) ***Brazing:*** joining base metals together using a filler rod which has a lower melting point than the metals. The filler rod is made to flow into the joint to provide a strong bond.

   (c) ***Welding:*** joining by melting base metals and allowing them to fuse together.

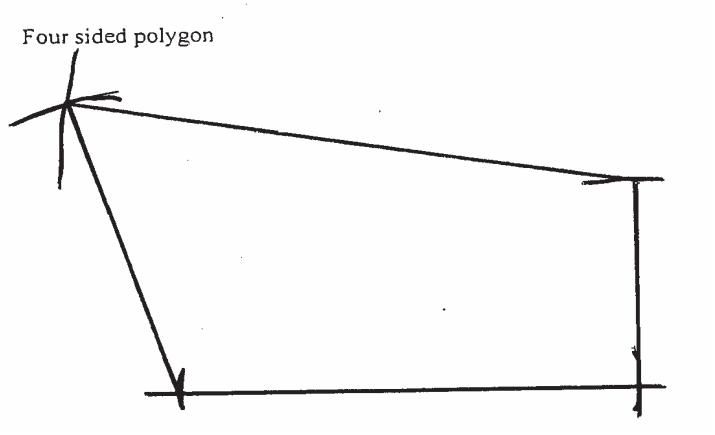
   (3 ×1=3 marks)

4.



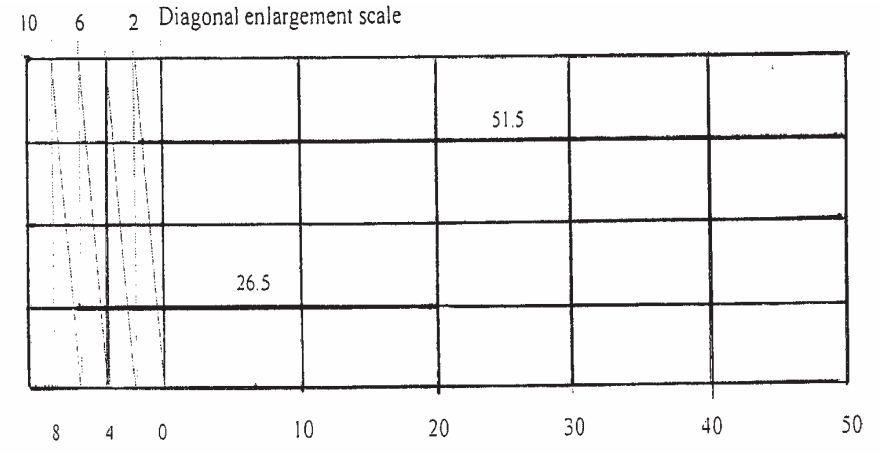
(4 marks)

5.



(3 marks)

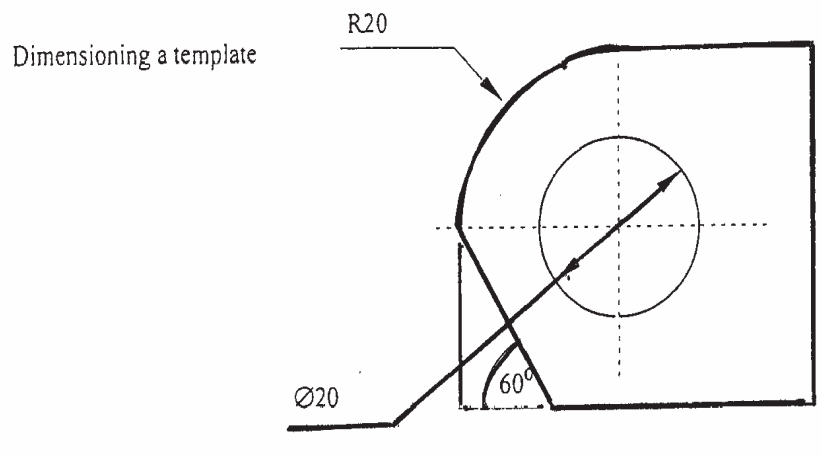
6.



(4 marks)

7.

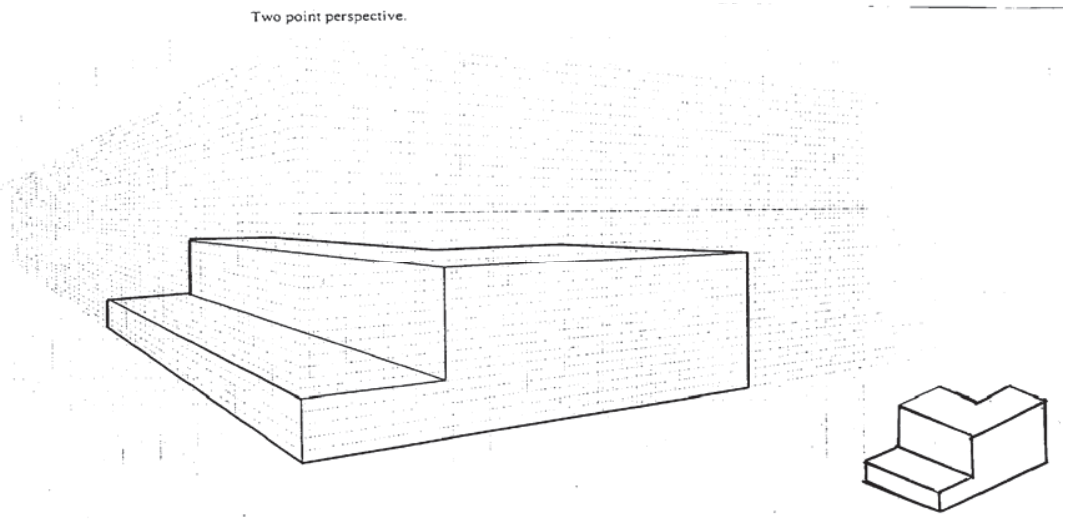
(a)



(3 marks)

(b)

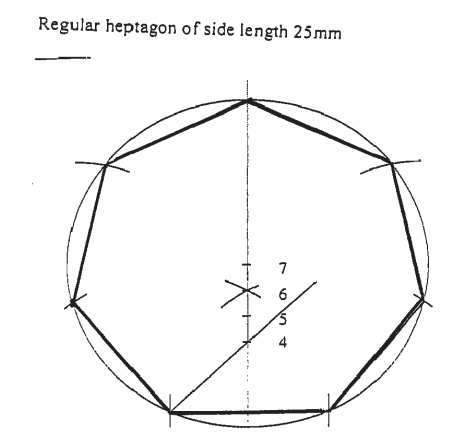
Two point perspective.



(3 marks)

8.

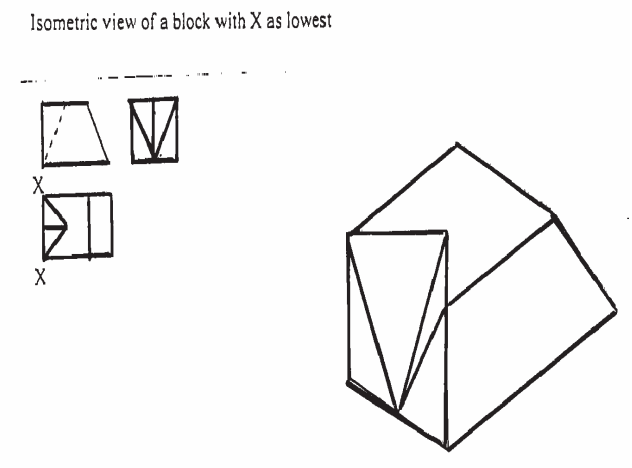
Regular heptagon of side length 25mm



(4 marks)

9.

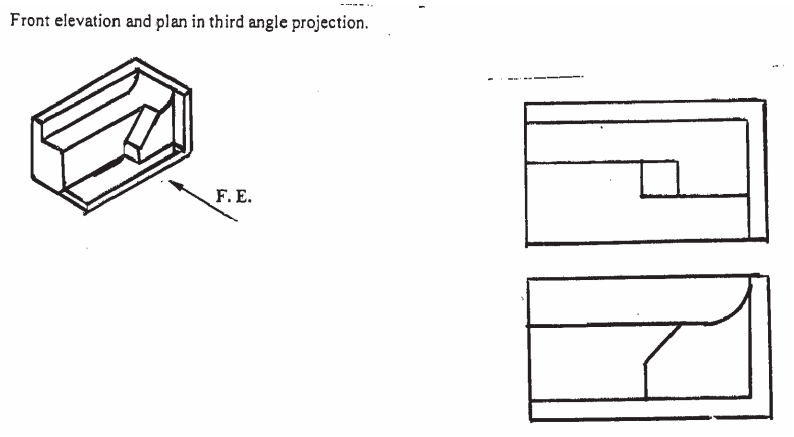
Isometric view of a block with X as lowest



(3 ½ marks)

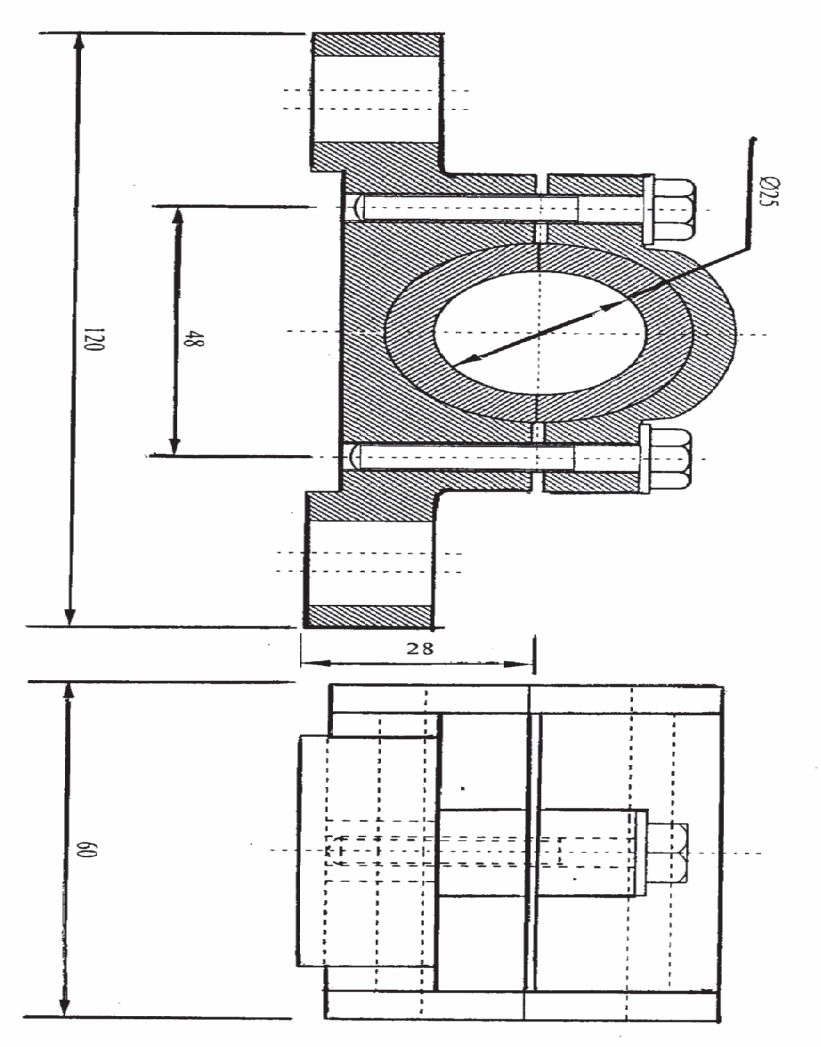
10.

Front elevation and plan in third angle projection.



(5 marks)

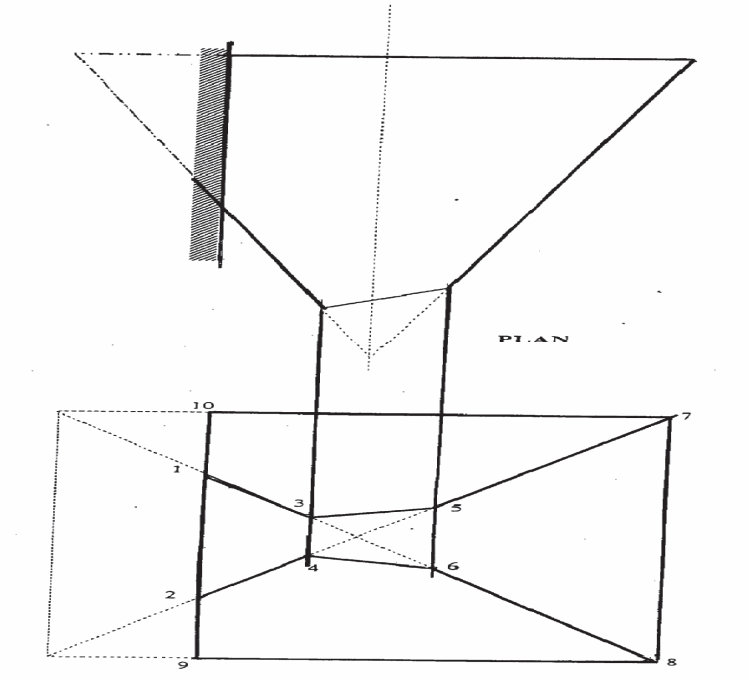
11.



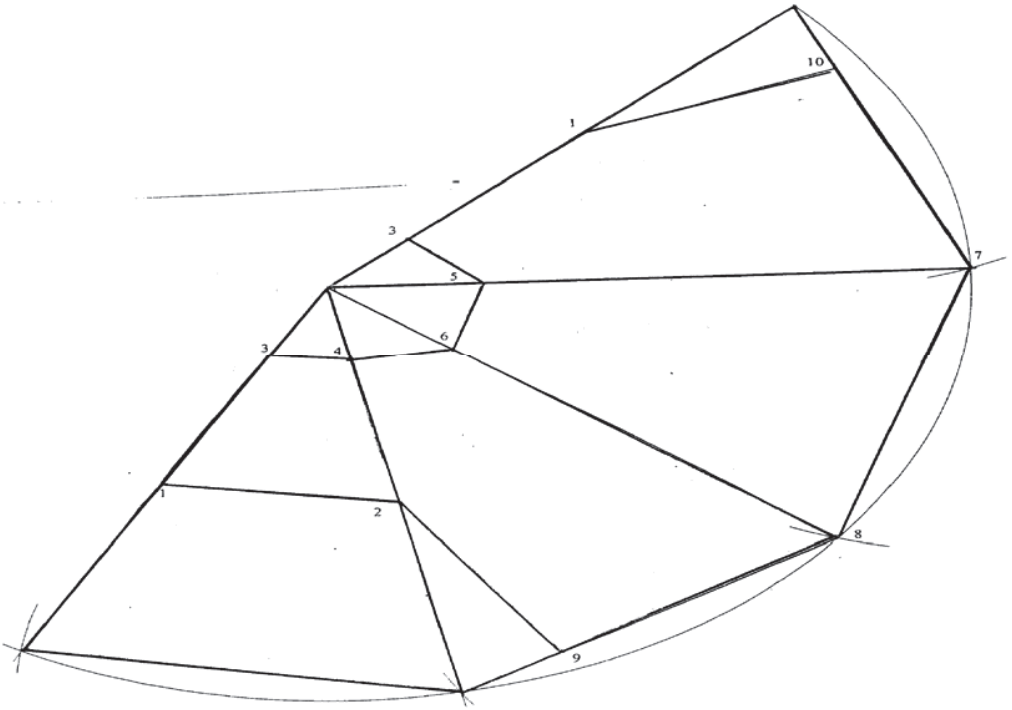
(30 marks)

12.

(a)

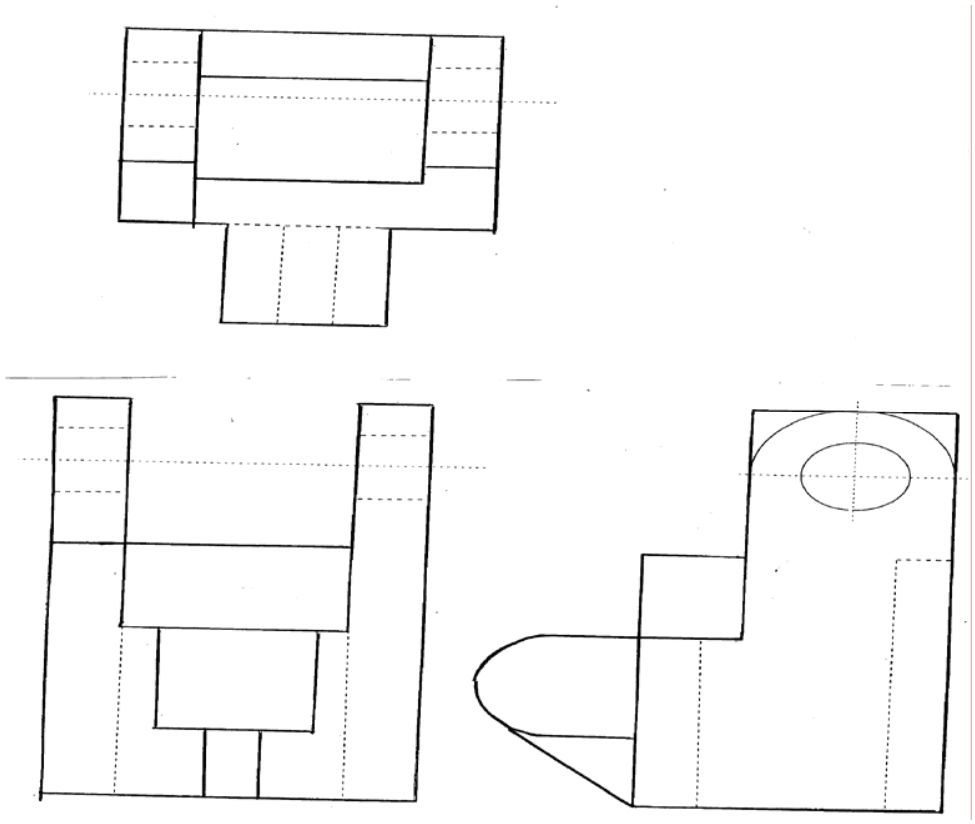


(b)



(15 marks)

13.

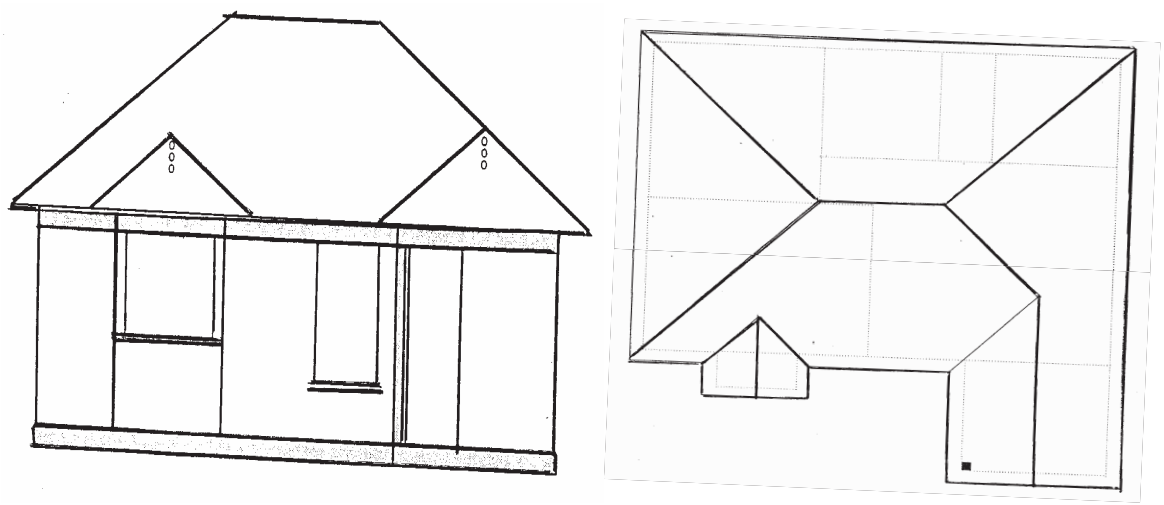


(15 marks)

14.

(a)

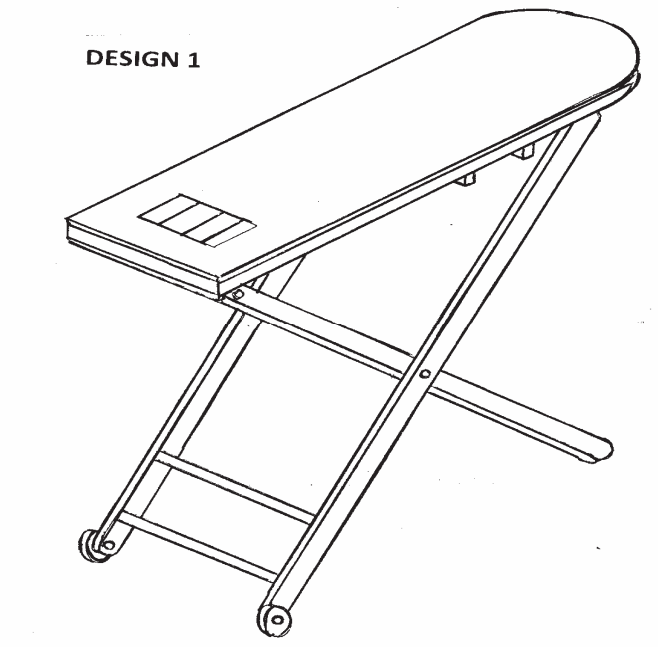
(b)

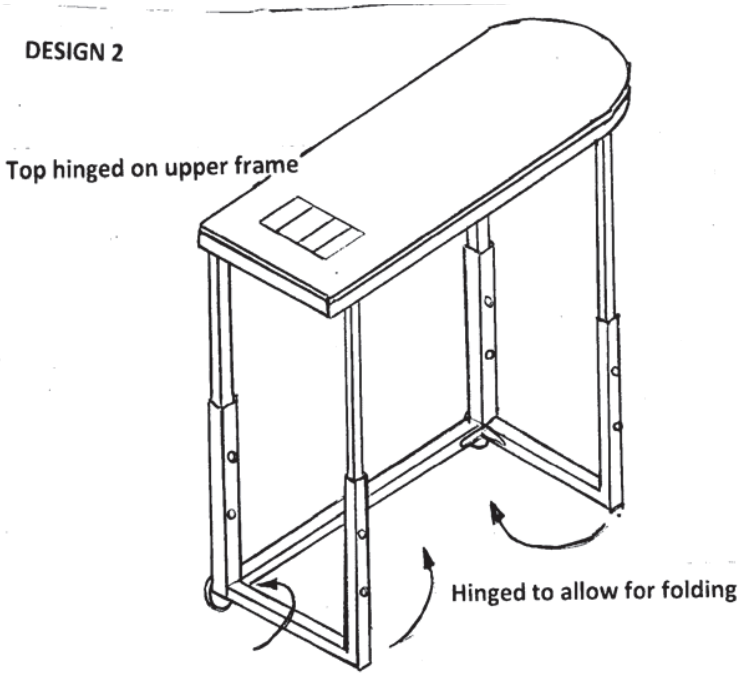


(15 marks)

30.20.1 Drawing & Design Paper 2 (449/2)

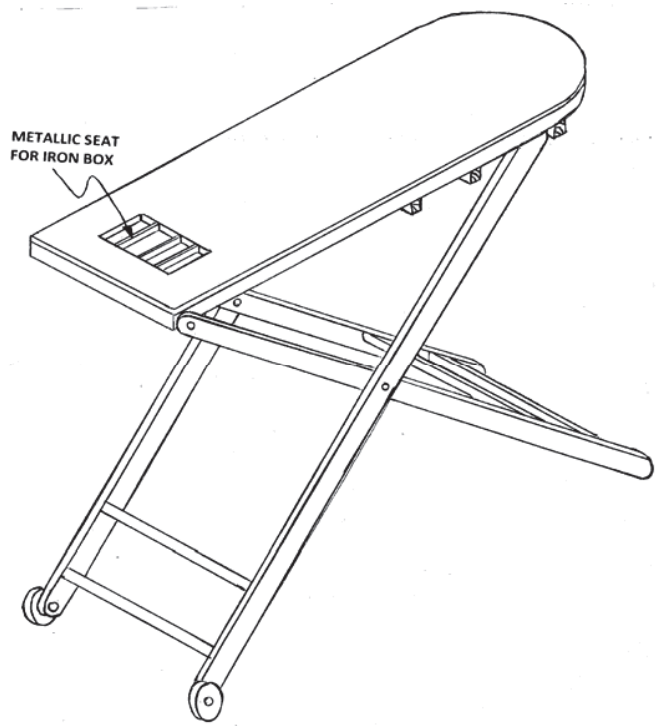
1.


DESIGN 1


DESIGN 2
Top hinged on upper frame
Hinged to allow for folding

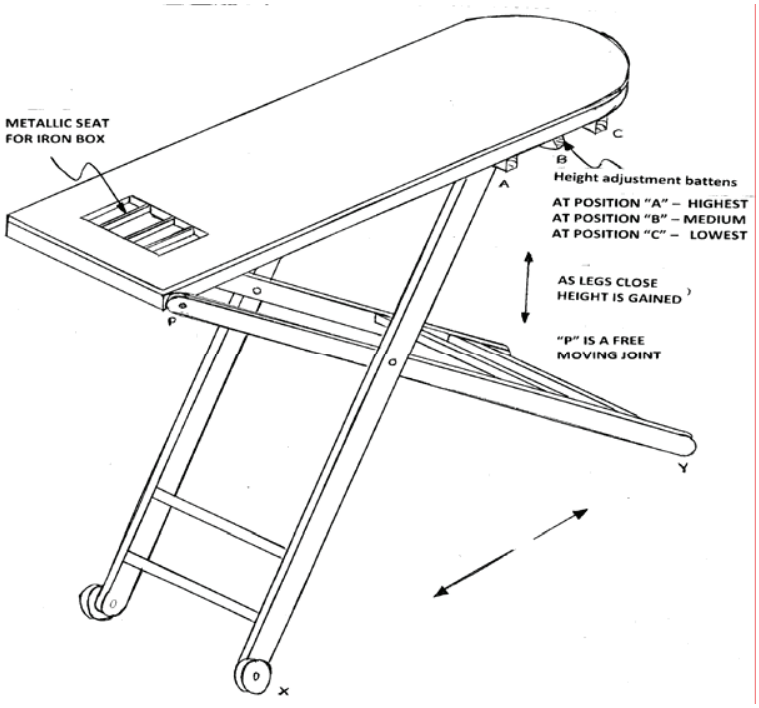
(6 marks)

2.



(13 marks)

3.



(14 marks)

4.

(i) ***Soft Pad / Cloth:*** used on top of the board.
Blockboard: used to support the soft pad.

(ii) ***Soft Pad / Cloth:***to apply some cushion for quality ironing.
Blockboard: to provide a flat base when ironing. It is also easy to use tack nails to join the pad to the board. ***(4 marks)***

5.

- Tack nails.
- Bolt: to join the two frames in order to allow for some oscillating movement.
- Contact glue: to join the pad to the board so as to remain flat through out.

(3 marks)