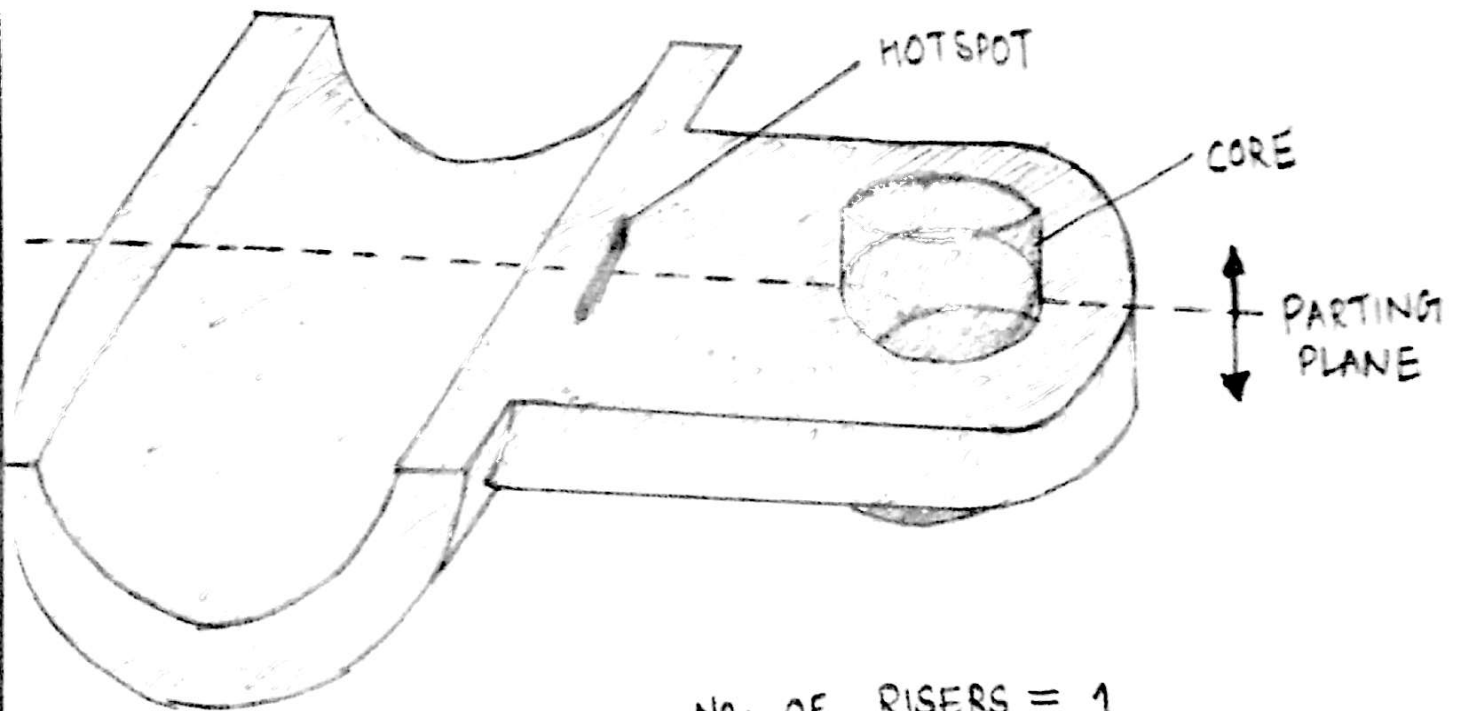


ROUGH DRAWING OF
THE CASTING



NO. OF RISERS = 1

• CALCULATIONS :

① Volume of the casting :

$$= \left[\frac{\pi (40^2 - 24^2) \times 64}{2} + \frac{\pi (24^2 - 12^2) \times 16}{2} + 24 \times 16 \times 48 - \frac{\pi \times 12^2 \times 16}{2} + \frac{1}{2} \times 3 \times 16 \times 48 \right] \text{ mm}^3$$

$$= 129765.93 \text{ mm}^3$$

(This volume has been calculated by taking assumption that the common part to both the hollow cylinder and straight part is a triangle as shown below. This eases the calculations)



Volume of the casting (Using SOLIDWORKS): 129454.02 mm³

Since the volume given by both methods is almost equal, our assumption may be treated valid.

② Surface area of the casting :

$$= \left[\frac{\pi (40^2 - 24^2) \times 2}{2} + \pi \times 64 \times 24 + 64 \times 16 \times 2 + 2\pi \times 40 \times 64 \times \frac{56.43}{360} + 16 \times 16 \times 2 \right. \\ \left. + \pi (24^2 - 12^2) + 24 \times 48 - \frac{\pi \times 12^2}{2} + 24 \times 48 - \frac{\pi \times 12^2}{2} + 24 \times 16 \times 2 + \pi \times 24 \times 16 + 3 \times 16 \right]$$

$$= 22715.30 \text{ mm}^2$$

(This surface area has been calculated using the same assumptions)

Surface Area of the casting (Using SOLIDWORKS): 23927.66 mm²

So, $\left(\frac{V}{A}\right)_{\text{casting}} = 5.41$

• Chvorinov's Method:

$$\left(\frac{V}{A}\right)_{\text{Riser}} = 1.2 \left(\frac{V}{A}\right)_{\text{casting}}$$

$$\Rightarrow \left(\frac{V}{A}\right)_{\text{Riser}} = 1.2 \times 5.41 = \underline{6.49}$$

$$\Rightarrow \left(\frac{\frac{\pi D^2 H}{4}}{\pi D H + \frac{\pi D^2}{4}}\right)_{\text{Riser}} = 6.49$$

$$\Rightarrow \left(\frac{DH}{4H + D}\right)_{\text{Riser}} = 6.49$$

Taking $H = 1.5D$, we get

$D_{\text{Riser}} = 30.28 \text{ mm}$ $H_{\text{Riser}} = 45.43 \text{ mm}$

• Caine's Method:

$$X = \frac{a}{Y-b} + c$$

$$X = \frac{(A/V)_{\text{casting}}}{(A/V)_{\text{Riser}}}$$

$$\frac{(V/A)_{\text{Riser}}}{(V/A)_{\text{casting}}} = \frac{0.1}{\frac{V_{\text{Riser}}}{V_{\text{casting}}} - 0.03} + 0.8$$

$$Y = \frac{V_{\text{Riser}}}{V_{\text{casting}}}$$

Putting $H = 1.5D$, we get

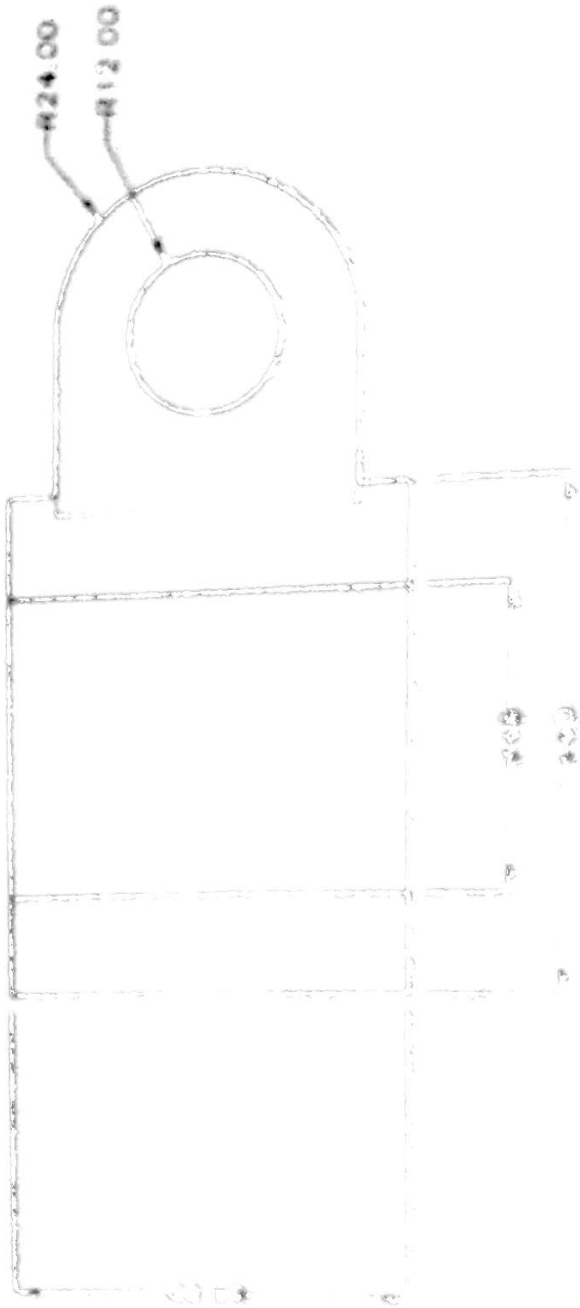
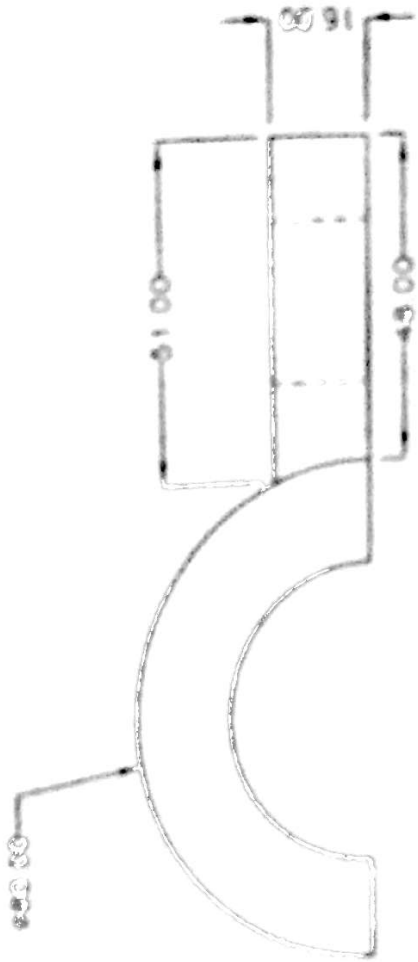
$D_{\text{Riser}} = 30.84 \text{ mm}$ $H_{\text{Riser}} = 46.26 \text{ mm}$

$$c = 0.8$$

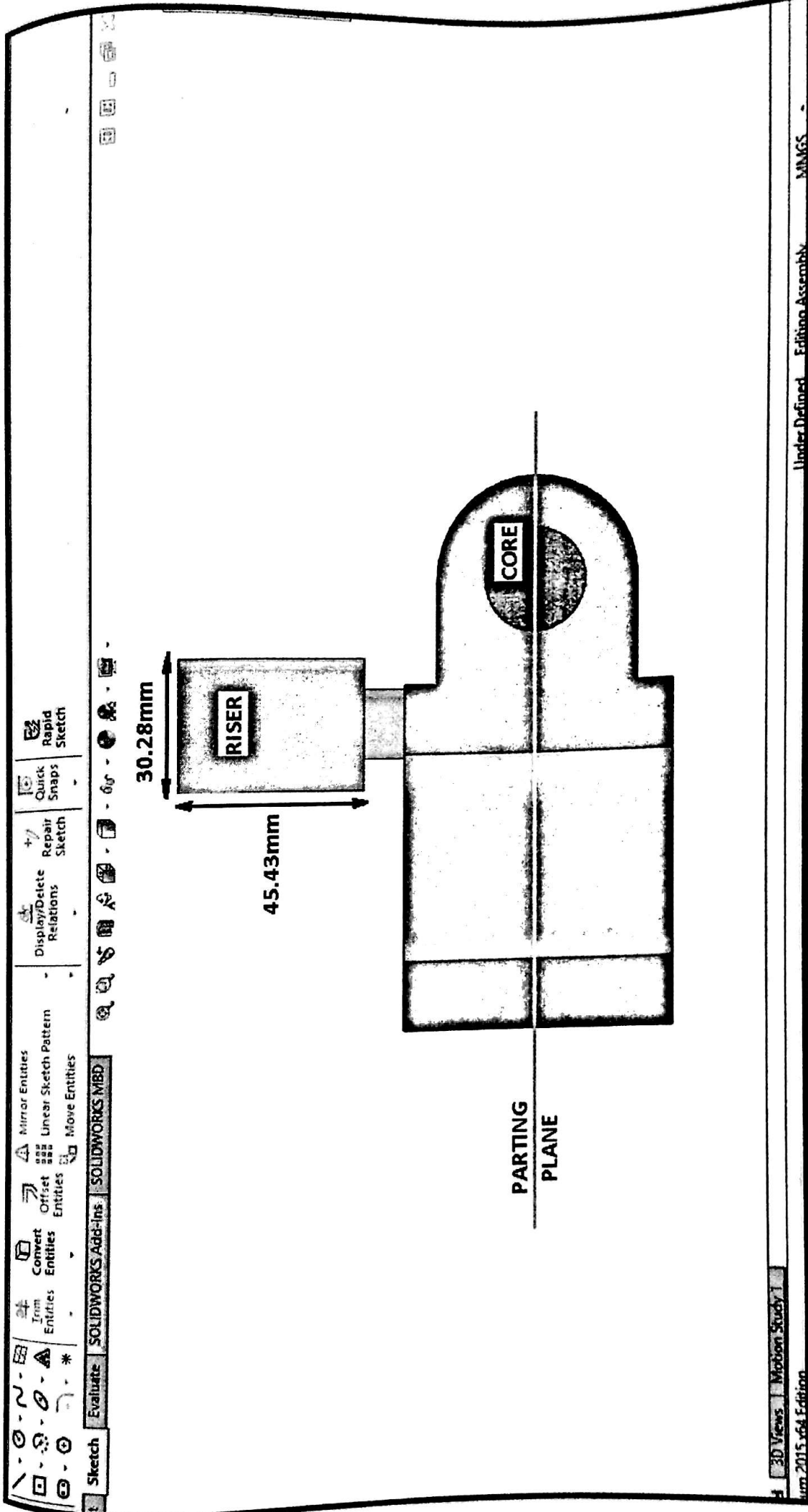
$$a = 0.1$$

$$b = 0.03$$

The original drawing used for casting



Handwritten signature or name.



30.28mm

45.43mm

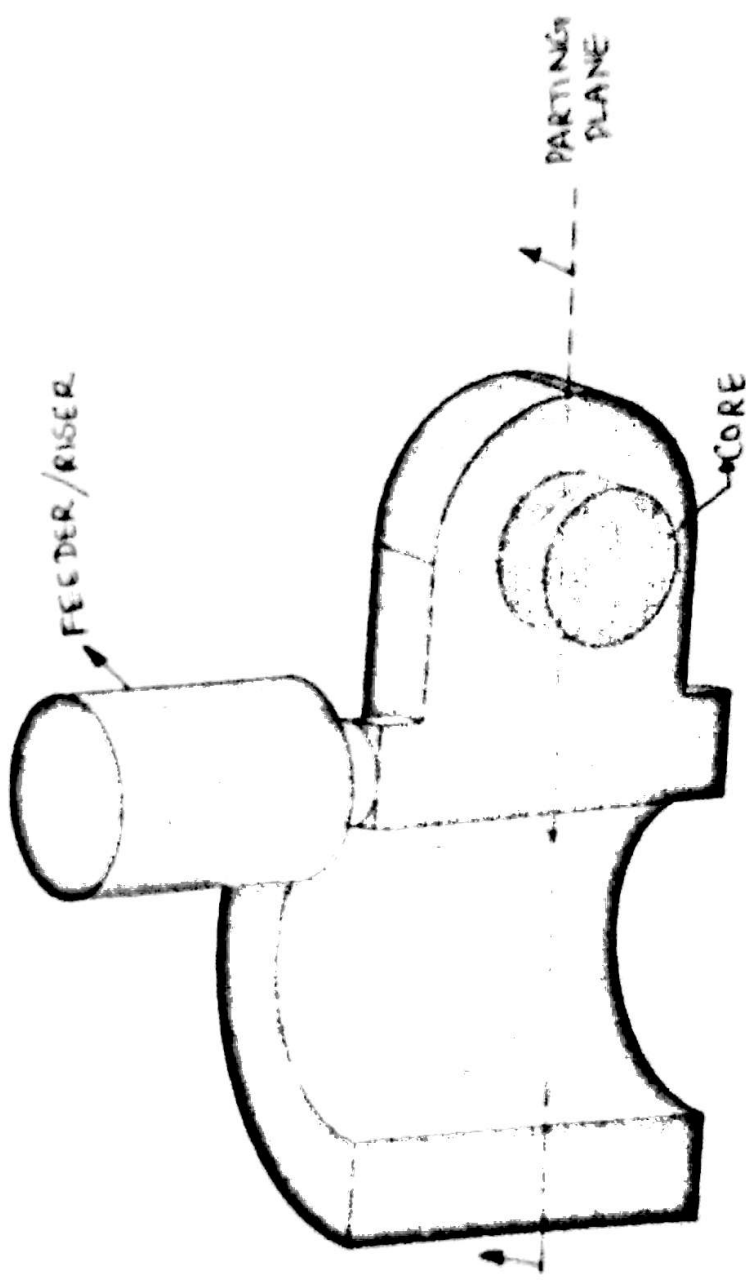
RISER

CORE

PARTING
PLANE

Isometric view of the casting along with the position of the core and feeder.

Home Insert Components Make Move Component Show Hidden Component
 Isometric Front View Top View Left View Right View Bottom View Section View Hidden Line Removal Hide Component Show Component Hide All Components Show All Components



SOLIDWORKS CAD MODEL FOR THE FINAL CASTING

The screenshot displays the SolidWorks CAD interface with four views of a casting part:

- FRONT VIEW:** Shows a semi-circular base with a vertical rectangular section on the right side.
- TOP VIEW:** Shows a rectangular base with a semi-circular cutout on the left side and a circular hole on the right side.
- SIDE VIEW:** Shows a rectangular profile with a vertical rectangular section on the right side.
- ISOMETRIC VIEW OF CASTING:** Shows a 3D perspective view of the casting part, highlighting its semi-circular base, rectangular section, and circular hole.

The software interface includes a menu bar at the top with options like 'Evaluate', 'DimXpert', 'SOLIDWORKS Add-Ins', and 'SOLIDWORKS MBD'. A toolbar on the left contains various icons for sketching and modeling. The status bar at the bottom indicates 'Model: 3D Views: Motion Study' and 'Premium 2015 x64 Edition'.