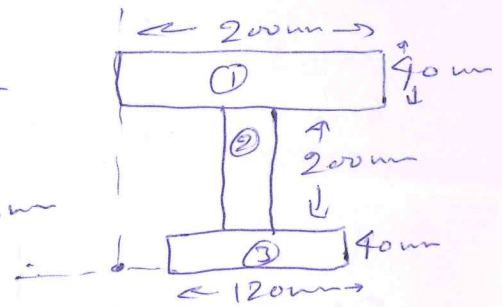


Answer Sheet for IAE-I Aircraft Structure - II Sem - VI, Batch - 10 & 11

Ans-1-

$$\bar{x} = \frac{A_1 x_1 + A_2 x_2 + A_3 x_3}{A_1 + A_2 + A_3} = 100 \text{ mm}$$

$$\bar{y} = \frac{A_1 y_1 + A_2 y_2 + A_3 y_3}{A_1 + A_2 + A_3} = 158.46 \text{ mm}$$



$$I_{xx} = I_{xx1} + I_{xx2} + I_{xx3}$$

$$I_{yy} = I_{yy1} + I_{yy2} + I_{yy3}$$

Ans-2-

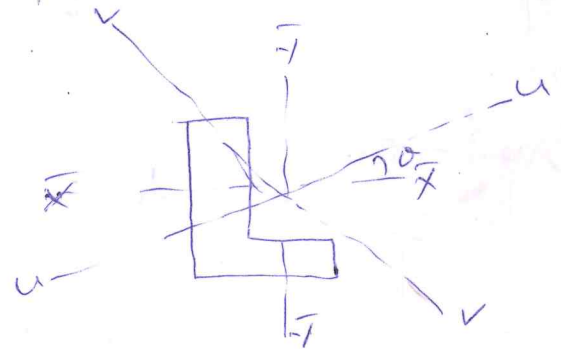
Find \bar{x} & \bar{y}
by above solution of
 $\alpha = 20^\circ$.

$$I_{uu} = \int u^2 dA$$

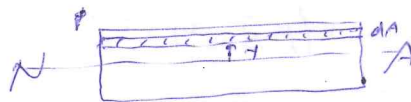
$$I_{vv} = \int v^2 dA$$

$$I_{uv} = \int uv \cdot dA = 0$$

$$\tan 20 = \frac{2 I_{xy}}{I_{xx} - I_{yy}}$$



Ans-3-

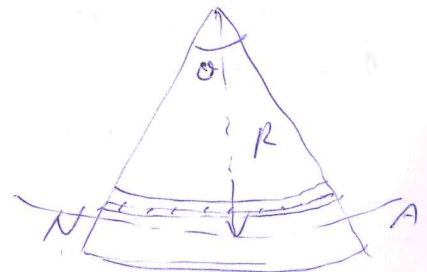


$$\frac{M}{I} = \frac{\sigma}{r} = \frac{E}{R}$$

$$\sigma = \frac{E [R\theta - r\theta]}{R\theta} = (R-r)\theta$$

$$\sigma = \frac{E r \theta}{R\theta}$$

$$\frac{\sigma}{r} = \frac{E}{R}$$



Ans - 4 -

$$\bar{x} = \frac{A_1 x_1 + A_2 x_2 + A_3 x_3}{A_1 + A_2 + A_3}$$

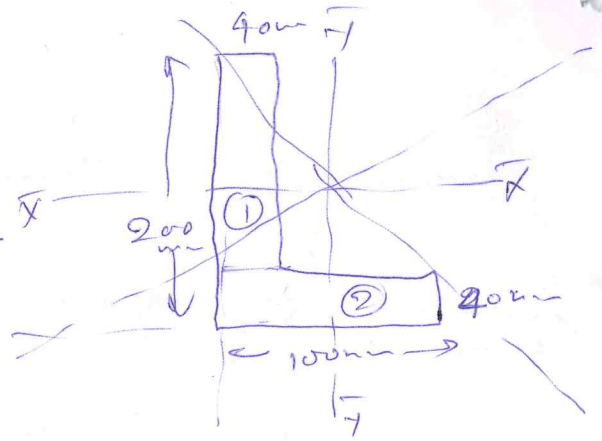
$$\bar{y} = \frac{A_1 y_1 + A_2 y_2 + A_3 y_3}{A_1 + A_2 + A_3}$$

$$I_{xx} = I_{xx_1} + I_{xx_2} + I_{xx_3}$$

$$I_{yy} = I_{yy_1} + I_{yy_2} + I_{yy_3}$$

$$\tan 2\theta = \frac{2I_{xy}}{I_{yy} - I_{xx}}$$

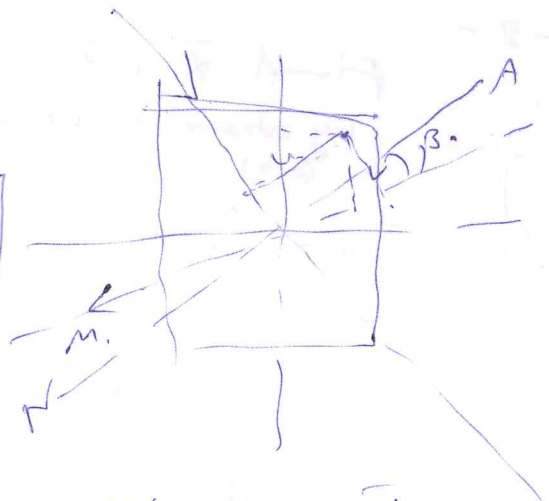
$$\theta = \frac{1}{2} \tan^{-1} \left[\frac{2I_{xy}}{I_{yy} - I_{xx}} \right]$$



Ans - 5 -

$$\tan \beta = \frac{v}{u}$$

$$\beta = \tan^{-1} \cdot \frac{M_v \frac{I_{yy}}{M_u} \times \frac{I_{xx}}{I_{yy}}}{M_u \frac{I_{xx}}{I_{yy}}}$$



Ans - 6 ->

$$\sigma = \frac{y (M_{xx} I_{yy} + M_{yy} I_{xx}) - x (M_{xy} I_{xx} + M_{yx} I_{yy})}{I_{xx} \cdot I_{yy} - (I_{xy})^2}$$

