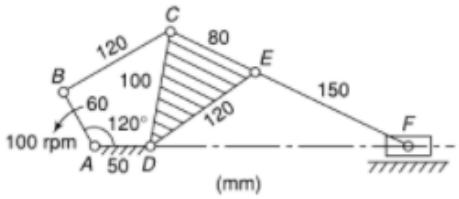
1. For the mechanism shown in the figure below, determine the velocities of the points C, E and F and the angular velocities of the links BC, CDE and EF.



[5 marks]

Solution:

(a) Step-1 : find the angle B, C, D in Quadrilateral ABCD.

Construct triangle ABD

$\cos A = \frac{AB^2+AD^2-BD^2}{2 \times AB \times AD}$

$\cos 120^0 = \frac{60^2 + 50^2 - BD^2}{2 \times 60 \times 50}$

$BD^2 = 9100$ mm

$\boldsymbol{BD = 95.4}$ **mm**

In triangle BCD,

$\cos C = \frac{BC^2 + CD^2 - BD^2}{2 \times BC \times CD} = \frac{120^2 + 100^2 - 9100}{2 \times 120 \times 100} = 0.6375$

C = 50. 39 ^{0}

Angle B = angle ABD + angle CBD

$\cos ABD = \frac{AB^2 + BD^2 - AD^2}{2 \times AB \times BD} = \frac{60^2 + 9100 - 50^2}{2 \times 60 \times 95.4} = 0.891$

$\boldsymbol{angle\ ABD = 27.00\ degree}$

$\cos CBD = \frac{BC^2 + BD^2 - CD^2}{2 \times BC \times BD} = \frac{120^2 + 9100 - 100^2}{2 \times 120 \times 95.4} = 0.590$

$\boldsymbol{angle\ CBD = 53.9\ degree}$

Angle B = 27 + 53.9 = 80.9 degree

Angle D = 360 – angle A – angle B – angle C = 360 – 120 – 80.9 – 50 .39 = calculate yourself

Rest DO YOURSELF