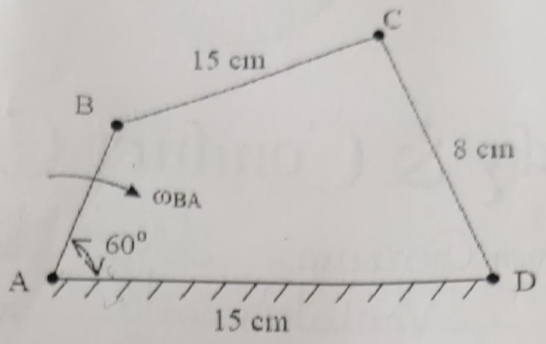
1. *Four – Bar Mechanism*: In a four bar chain ABCD link AD is fixed and in 15 cm long. The crank AB is 4 cm long rotates at 180 rpm (cw) while link CD rotates about D is 8 cm long BC = AD and | BAD = 60°. Find angular velocity of link CD.



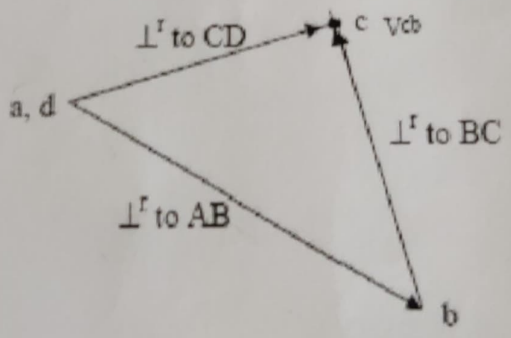
Configuration Diagram

Velocity vector diagram

$$V_b = \omega r = \omega_{ba} \times AB = \frac{2\pi \times 120}{60} \times 4 = 50.24 \text{ cm/sec}$$

Choose a suitable scale

1 cm = 20 m/s = $\overline{ab}$



$V_{cb} = \overrightarrow{bc}$

$V_c = \overrightarrow{dc} = 38 \text{ cm/sec} = V_{cd}$

We know that $V = \omega R$

$$V_{cd} = \omega_{CD} \times CD$$

$$\omega_{CD} = \frac{V_{cd}}{CD} = \frac{38}{8} = 4.75 \text{ rad/sec (cw)}$$

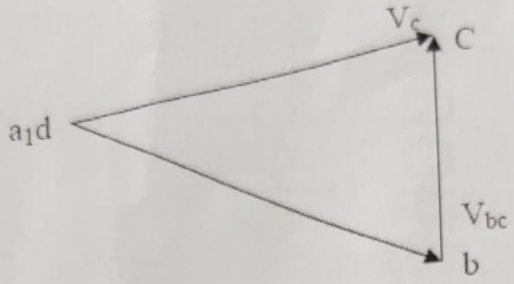
Step 1: Draw configuration diagram to a scale.

Step 2: Draw velocity vector diagram to a scale.

$V_b = \omega_2 \times AB$

$V_b = 10.5 \times 0.05$

$V_b = 0.525$ m/s



Step 3: Prepare a table as shown below:

Sl. No.	Link	Magnitude	Direction	Sense
1.	AB	$f^c = \omega^2_{AB} r$ $f^c = (10.5)^2/0.525$ $f^c = 5.51$ m/s^2	Parallel to AB	→ A
2.	BC	$f^c = \omega^2_{BC} r$ $f^c = 1.75$ $f^t = \alpha r$	Parallel to BC $\perp^r$ to BC	→ B –
3.	CD	$f^c = \omega^2_{CD} r$ $f^c = 2.75$ $f^t = ?$	Parallel to DC $\perp^r$ to DC	→ D –

Step 4: Draw the acceleration diagram.