In a slider crank mechanism, crank AB = 20 mm & connecting rod BC = 80 mm. Crank AB rotates with uniform speed of 1000 rpm in anticlockwise direction.......

Question:

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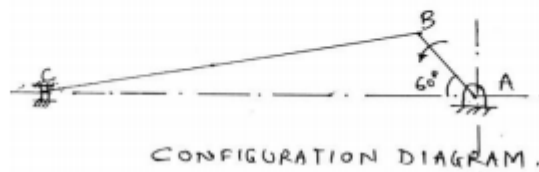Find (i) Angular velocity of connecting rod BC

(ii) Velocity of slider C. When crank AB makes an angle of 60 degrees with the horizontal.

Draw the configuration diagram also.

Use analytical method.

Answer:

Data- Crank AB=20mm; Connecting rod BC=80mm; N_{BA}= 1000 rpm (anticlockwise)
Crank angle = θ= 60° ; n = l/r = 80/20 =4

CONFIGURATION DIAGRAM.

[1 Mark]

Angular velocity of crank = ω_{BA} = $2\pi N/60$ = $\dfrac{2 \ X \ \pi \ X \ 1000}{60}$ = 104.71 rad/sec

Angular velocity of connecting rod = ω_{BC} = $\dfrac{\omega \cos \theta}{n}$

$$= \dfrac{104.71 \ X \ \cos 60^0}{4} = 13.08 \ rad/sec \quad ...[\ 1 \ Mark \ ]$$

Velocity of slider C = Vc = ω r $\left[sin\theta + \dfrac{sin \ 2\theta}{2n} \right]$

$$= 104.71 \ X \ .02[\ sin \ 60 + \dfrac{sin \ 120}{2 \ X \ 4}]$$

$$= 2.04 \ m/s \qquad .... \quad [\ 2 \ Marks]$$