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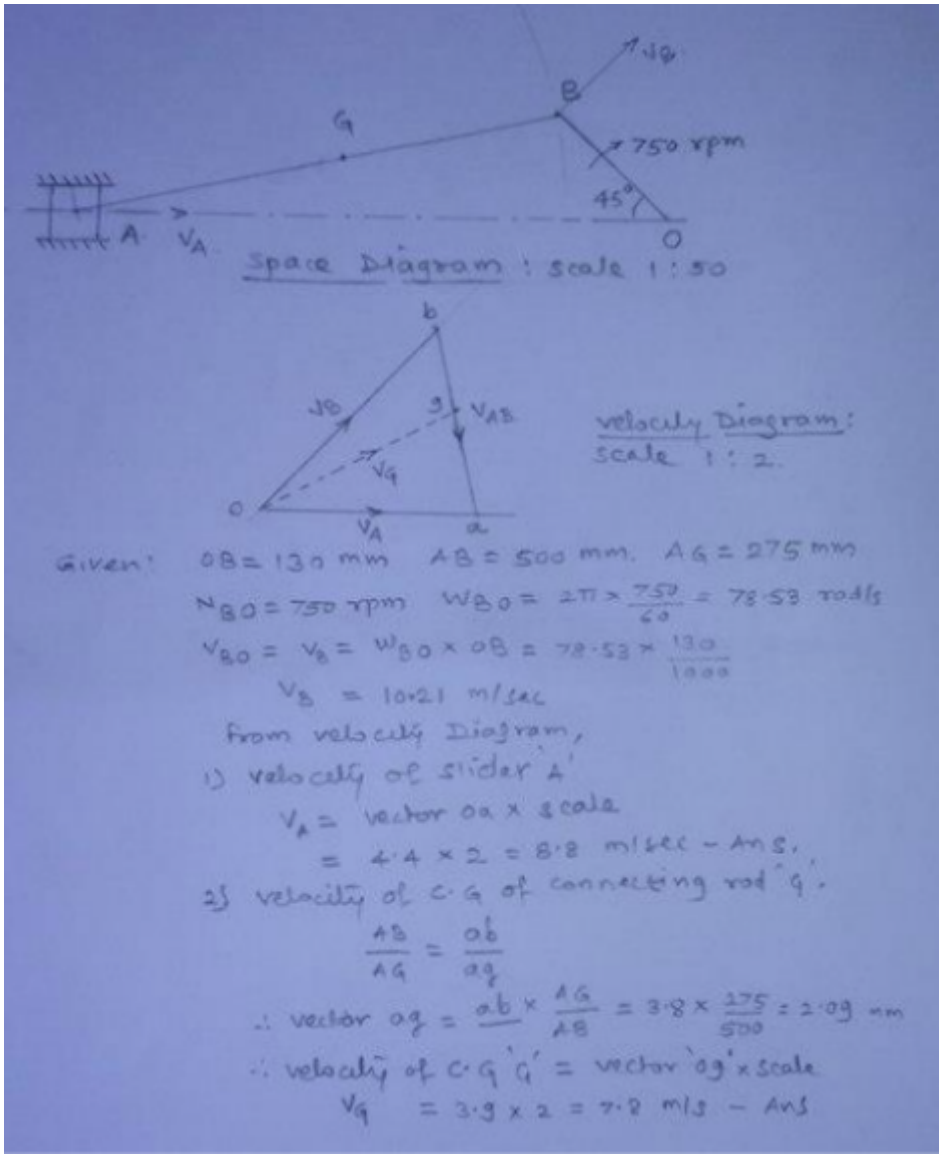
In slider crank mechanism, the length of crank OB and.....

Question:
In slider crank mechanism, the length of crank OB and connecting rod AB are 130 mm and 500 mm respectively. The centre of gravity G of the connecting rod is 275 mm from slider A. The crank speed is 750 rpm in clockwise. When crank has turned 45 from inner dead centre position determine (i) velocity of slider 'A' (ii) velocity of centre of gravity of connecting rod 'G'.

Answer:



Given: $OB = 130$ mm $AB = 500$ mm. $AG = 275$ mm

$N_{BO} = 750$ rpm $\omega_{BO} = 2\pi \times \frac{750}{60} = 78.53$ rad/s

$V_{BO} = V_B = \omega_{BO} \times OB = 78.53 \times \frac{130}{1000}$

$V_B = 10.21$ m/sec

from velocity Diagram,

1) velocity of slider 'A'

V_A = vector oa x scale

= 4.4 x 2 = 8.8 m/sec - Ans.

2) velocity of C.G of connecting rod 'G'.

$$\frac{AB}{AG} = \frac{ab}{ag}$$

$\therefore$ vector $ag = ab \times \frac{AG}{AB} = 3.8 \times \frac{275}{500} = 2.09$ cm

$\therefore$ velocity of C.G 'G' = vector 'og' x scale

V_G = 3.9 x 2 = 7.8 m/s - Ans