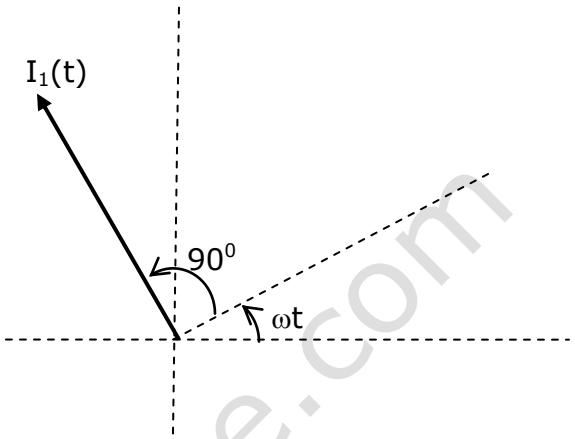
Q- Represent current waveforms I_1 = 4 cos (ωt) and I_2 = 3 sin (ωt) in a phasor diagram, using sin (wt) as the reference phasor. Now represent the resultant current waveform on the phasor diagram in the same way.

The current wave forms can be written as

(i) $I_1(t) = 4\cos(\omega t)$

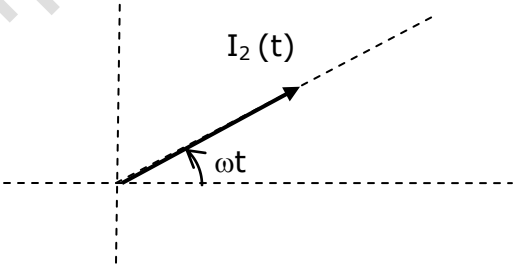
Or $I_1(t) = 4\sin(\omega t + 90^0)$

And thus at t = 0 the phase angle is 90^0 and hence this current can be shown on phasor diagram as in the diagram.



(ii) $I_2(t) = 3\sin(\omega t)$

And thus at t = 0 the phase angle is 0 and hence this current can be shown on phasor diagram as in the diagram



The two current waveforms can be represented on the same phase diagram. As the currents are here shown by the vectors of magnitudes 4 A and 3A respectively, if both waveforms are simultaneously present their resultant waveform I (t) is shown by the vector sum of the two vectors and thus given by the diagonal of the parallelogram (rectangle here) form by the two vectors thus given as in diagram.

Clearly the magnitude of the resultant waveform will be 5 A and the phase angle will be ωt + $\tan^{-1}(4/3)$