Q- An alternating waveform is given by the voltage as a function of time as

$$V(t) = 3 \cos (2t) + 4 \sin (2t)$$

Calculate the peak voltage, rms voltage and the phase at t = 0.

The function can be written as

$$V(t) = 3\cos 2t + 4\sin 2t$$

Or
$$V(t) = \sqrt{3^2 + 4^2} \left(\frac{3}{5}\cos 2t + \frac{4}{5}\sin 2t\right)$$

Or
$$V(t) = 5 (\sin 37^{\circ} \cos 2t + \cos 37^{\circ} \sin 2t)$$

Or
$$V(t) = 5 \sin(2t + 37^0)$$

Hence the peak value of this voltage is $V_{\rm m}$ = 5 volt

The RMS value of the voltage is given by

$$V_{rms} = \frac{V_m}{\sqrt{2}} = \frac{5}{\sqrt{2}} = 3.54 V$$

And the phase angle at t = 0 will be 37^{0} .