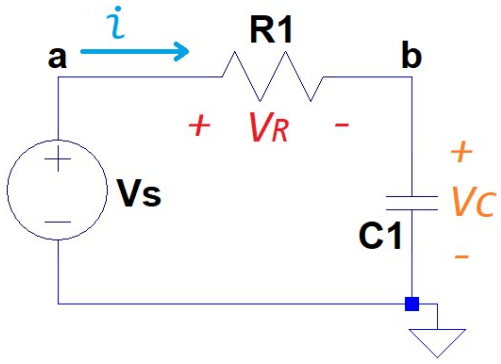

Given $V_s = 10\cos(2513.27412\,t)$, $R = 100\,\Omega$, $C = 2\mu$ F, determine values of the following variables at AC steady state:

Q1. Magnitude of V_s in Vpp (peak-to-peak voltage),

Q2. Frequency of V_s in Hz,

Q3. Impedance of resistor R in ohm,

Q4. Impedance of capacitor C in ohm (if it is a complex, write in `a + j b` format---there is a space between j and the imaginary number),

Q5. Magnitude of current i in App (peak-to-peak ampere),

Q6. Frequency of current i in Hz,

Q7. Phase θ_i of current i (with reference to the phase of voltage Vs) in radian within range $(-\pi, \pi]$,

Q8. Phase θ_i in degree within range (-180, 180],

Q9. Average power P_R dissipated over resistor R in watt,

Q10. Average power P_C dissipated over capacitor C in watt.

Hint: convert Vs to phasor and use phasor analysis.

Write your answers in the following format.

Q1.1. magpp_vs = 0 V
Q1.2. freq_vs = 0 Hz
Q1.3. ZR = 0 ohm
Q1.4. ZC = 0 ohm
Q1.5. magpp_i = 0 A
Q1.6. freq_i = 0 Hz
Q1.7. phase_i = 0 rad
Q1.8. phase_i = 0 deg
Q1.9. PR = 0 W
Q1.10. PC = 0 W