Q 1 For the entire circuit in Fig. 1, calculate:
   (a) the power factor
   (b) the complex power delivered by the source
   (c) the average power delivered by the source
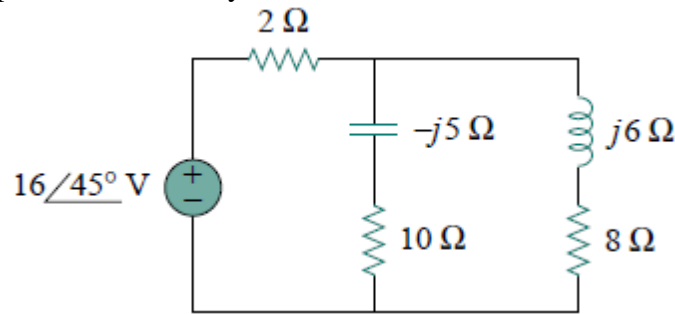   (d) the reactive power delivered by the source

$2\,\Omega$

$16\underline{/45^\circ}\ \text{V}$

$-j5\,\Omega$ $j6\,\Omega$

$10\,\Omega$ $8\,\Omega$

Fig. 1

Q 2   For the circuit shown in Fig. 2 find the frequency at which v_0 and v_i are in phase

R
R_1
C
V_i
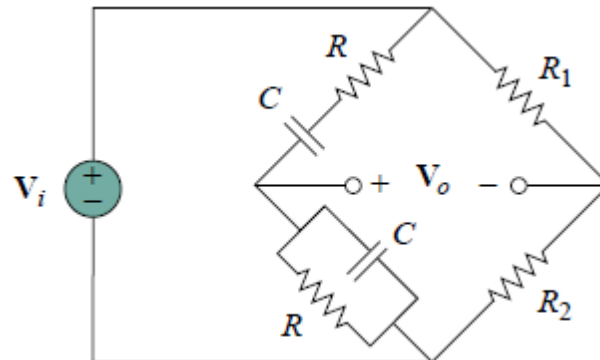$+\ V_o\ -$
C
R_2
R

Fig. 2

Q 3   Find $H(s) = V_o/I_i$ for the circuit given in Fig. 3. Illustrate that your answer is correct by dimensional and asymptotic check. Plot system poles and zeros

i_i $5\ \mu F$ $120\,\Omega$ $+$
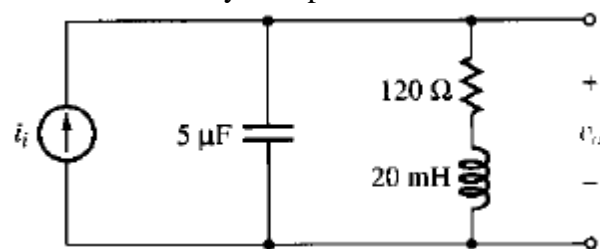v_o
$20\ \text{mH}$ $-$

Fig. 3

Q 4 In the circuit of Fig. 4 find the load impedance that will receive the maximum power when connected across terminals A and B. Compute the mvalue of maximum power as well.
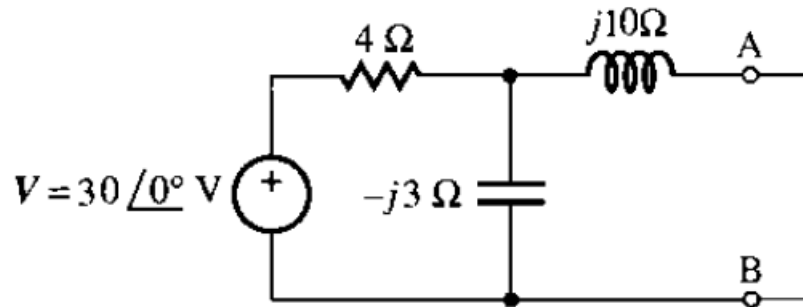

$4\,\Omega$ $j10\,\Omega$ A

$V = 30\underline{/0^\circ}$ V $-j3\,\Omega$ B

Fig. 4

Q 5 A load **Z** draws 20KVA at *pf* of 0.85 lagging from a 220V 50Hz rms sinusoidal source. Calculate
   (a) Average and reactive powers delivered to the load
   (b) Peak current
   (c) Load impedance
   (d) How can the *pf* be improved to 1

Q 6 A series RC circuit is connected to the household ac line (220V 50Hz single phase). If the rms voltage across resistance is 60V and average power dissipated by the circuit is 100W, what are the values of R, C, and the *pf*.