The University of Sheffield

Department of Electrical and Electronic Engineering

EEE117 Homework 4

1 Figure 1 is a complex plane with four quadrants labelled. For each of the following representations of an ac quantity, identify the quadrant in which it is situated.

(i) $-3 + j4$

(ii) $-12 - j5$

(iii) $j(1 - j)$

(iv) $3\angle -120$

(v) $6\angle 45$

(vi) $5\angle 135$

(vii) $3\cos(\omega t + 45)$

(viii) $4\sin \omega t$

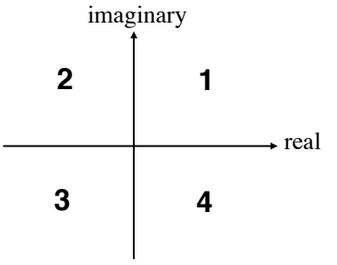

Figure 1

(*For **(vii)** and **(viii)** the positive real axis in figure 1 corresponds to the phase of* $\cos \omega t$)

2 Express parts **(i)**, **(ii)** and **(iii)** of Q1 in polar form.

3 Express parts **(iv)**, **(v)** and **(vi)** of Q1 in Cartesian form.

4 Express parts **(vii)** and **(viii)** of Q1 in polar form.

5 Write down the impedances of each of the circuits of figures 5a and 5b when looking into terminals A and B. You do not need to simplify the result - for example the impedance of a series combination of two resistors and a capacitor would give $Z = R_1 + R_2 + \dfrac{1}{j\omega C}$.

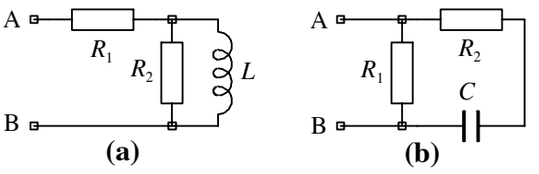

Figure 5