Q1

L$[f(t)]$

= $\phi(s)$

$= \int_0^\infty e^{-st} f(t)\, dt$

=$\int_0^\infty e^{-(\sigma+i\omega)t} f(t)\, dt = \int_0^\infty e^{-\sigma t}[\cos(\omega t) - i\, sin(\omega t)] f(t)\, dt$

$= \int_0^\infty e^{-\sigma t} \cos(\omega t)\, f(t)\, dt$ -$i \int_0^\infty e^{-\sigma t}\, sin(\omega t) f(t)\, dt$=$\int_0^\infty rp\, dt$-$i \int_0^\infty ip\, dt$=(irp)-i(iip)

WHERE rp=$e^{-\sigma t} \cos(\omega t)\, f(t)$ & ip=$e^{-\sigma t} \sin(\omega t)\, f(t)$

magnitude (a,b)=abs(irp(a,b)+%i*iip(a,b))

Q2

$[f(t)]$

= $\phi(s)$

$= \int_0^\infty e^{-st} f(t)\, dt$

=$\int_0^\infty e^{(\sigma+j0)t} f(t)\, dt = \int_0^\infty e^{\sigma t}[1] f(t)\, dt$

$= \int_0^\infty e^{\sigma t} f(t)\, dt$ =$\int_0^\infty rp\, dt$ =(irp)

magnitude (a)=abs(irp(a))

Q3

L$[f(t)]$

= $\phi(s)$

$= \int_0^\infty e^{-st} f(t)\, dt$

=$\int_0^\infty e^{(0+j\omega)t} f(t)\, dt = \int_0^\infty [\cos(\omega t) + j\, sin(\omega t)] f(t)\, dt$

$= \int_0^\infty \cos(\omega t)\, f(t)\, dt$ +$j \int_0^\infty sin(\omega t)] f(t)\, dt$

=$\int_0^\infty rp\, dt$+$j \int_0^\infty ip\, dt$=(irp)+i(iip)

WHERE rp=$\cos(\omega t)\, f(t)$ & ip=$\sin(\omega t)\, f(t)$

magnitude (b)=abs(irp(b)+%i*iip(b))