Faculty of Engineering (Shoubra)
Engineering Mathematics and
Physics Department

$4^{\text {th }}$ Quiz

Benha University
Mechanical Department
$2^{\text {st }}$ year Production
Time allowed:30 Minutes

Section:

1) Solve for $x(t)$ and $y(t)$, given that $x(0)=0, y(0)=3$, and

$$
\frac{\mathrm{dx}}{\mathrm{dt}}+\frac{\mathrm{dy}}{\mathrm{dt}}=0, \quad \mathrm{x}-\frac{\mathrm{dy}}{\mathrm{dt}}+\mathrm{y}=\mathrm{e}^{\mathrm{t}}
$$

2) Find $F(s)$ of the following functions:

$$
f(t)=\frac{e^{2 t}-e^{-3 t}}{t^{2}} \quad f(t)=\left\{\begin{array}{cc}
\text { sint } & 0<t \leq \pi \\
t-\pi & \pi<t \leq 2 \pi \\
\pi & t>2 \pi
\end{array}\right\}
$$

3) Expand in Fourier series the following functions

$$
f(x)=\left\{\begin{array}{ll}
\pi / 2+x, & -\pi \leq x \leq 0 \\
\pi / 2-x, & 0<x \leq \pi
\end{array} \quad f(x)=\left\{\begin{array}{lc}
x, & 0 \leq x \leq \pi \\
-(x-\pi), & \pi<x \leq 2 \pi
\end{array}\right.\right.
$$

