Benha University
Faculty of Engineering (Shoubra)
Electrical Engineering Department

3rd year Computers
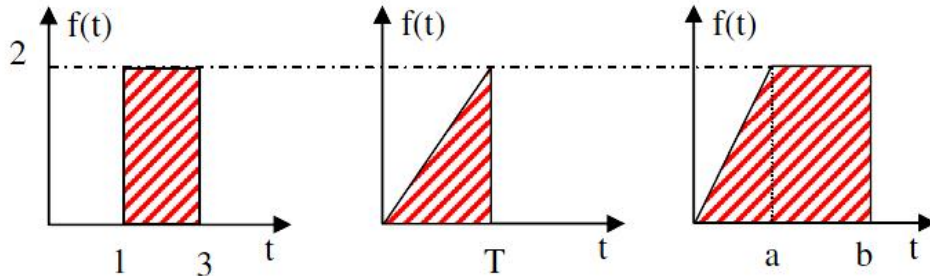**1st Semester, 2015-2016**
Subject: Automatic Control

Sheet (1)

1- For the following waveforms, find the function $f(t)$, then calculate $F(S)$.

2- Find the function $F(S)$ of the following systems

a) $f(t) = 3e^{-t} - e^{-2t}$

b) $f(t) = 2\,e^{-t}\cos(10t) - t^4 + 6\,e^{-(t-10)}$

c) $f(t) = \cos[2(t-1)] + \sin[2(t-1)]$

d) $f(t) = e^{-4t} + \sin(t-2) + t^2\,e^{-2t}$

3- Find the function $f(t)$ using Laplace transform tables of the following systems:

a) $F(S) = \dfrac{1}{S(S+1)}$

b) $F(S) = \dfrac{2(S+1)}{S(S+3)(S+5)^2}$

c) $F(S) = \dfrac{S}{(S+2)(S+1)^2}$

d) $F(S) = \dfrac{(S+3)(S+4)(S+5)}{(S+2)(S+1)}$

e) $F(S) = \dfrac{10}{(S+4)(S+1)^3}$

4- Find the solution of the control system described by the following differential equation:

$$\frac{d^2 y(t)}{dt^2} + 3\frac{dy(t)}{dt} + 6y(t) = e^{-2t}$$

Where $y(t)$ and $x(t)$ are the system output and input respectively, and the initial condition are,

$$\frac{dy(t)}{dt} = y(t) = 0$$

****