King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics
Math 513 Test 2
The First Semester of 2014-2015 (142)
Time Allowed: 40 Minutes

Name: _____ ID#: _____

Section/Instructor: _____ Serial #: _____

- Mobiles and calculators are not allowed in this exam.
- Provide details for full credit.

Question #	Marks	Maximum Marks
1		8
2		6
3		6
Total		20

Q1: (8 points): Derive the Fourier transforms for the following functions

1. $f(t) = \delta(t) + e^{-|t-a|}, \quad \text{for} \quad a > 0.$

2. $g(t) = e^{-at}H(t-a), \quad \text{for} \quad a > 0.$

Q2 (6 points): Let $g(t) = e^{-at}H(t)$, where $a > 0$. Show that

$$g(t) * g(t) = tg(t).$$

Q3 (6 points): Use Fourier transform and partial fractions to find a particular solution for the ordinary differential equation:

$$y'' + 5y' + 6y = e^{-2t}H(t).$$