USM Mechanical Engineering

EME 432 Internal Combustion Engines	Spring 2011	Prof. Horizon Gitano
Homework 10	Rev. 1	www.skyshorz.com/university/resource.php

**HW#10** **Internal Combustion Engines**

1) A passenger car gives the following velocity data during a "roll down" test on a flat road with no wind. The vehicle mass is 950kg and the frontal area is 2.4m². Determine the coefficient of rolling resistance (Crr) and the aerodynamic coefficient of drag (Cd).

Time sec	Speed kph
0	70.0
3	65.7
6	61.7
9	57.9
12	54.3
15	51.0
18	47.8
21	44.8
24	41.9
27	39.1
30	36.5
33	33.9
36	31.4
39	29.1
42	26.7
45	24.5
48	22.3
51	20.2
54	18.1
57	16.0
60	14.0
63	12.0
66	10.0
69	8.1
72	6.1
75	4.2
78	2.3
81	0.4
84	0.0
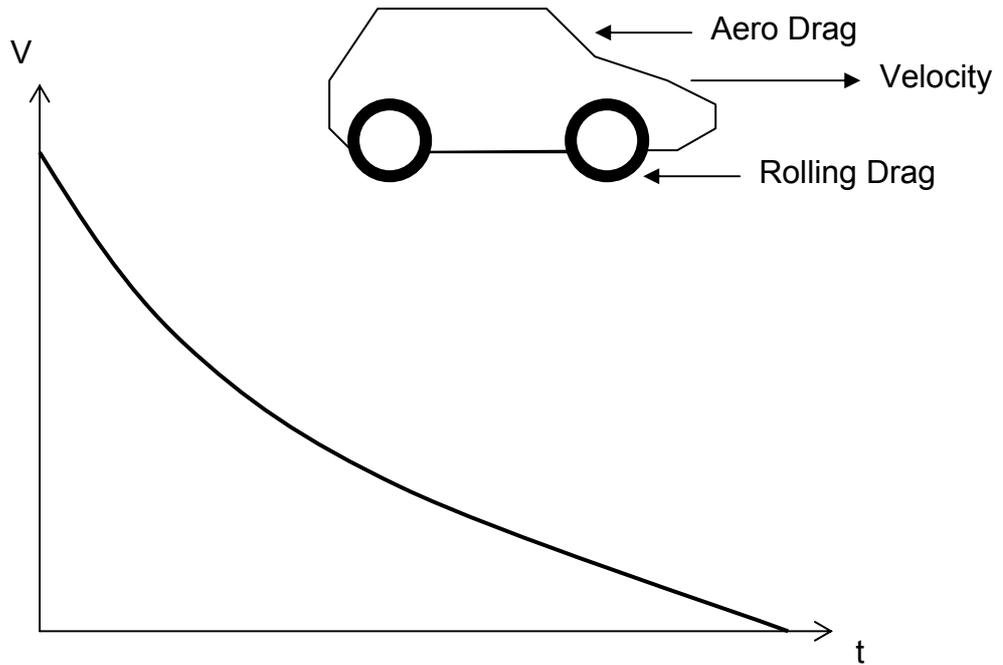
2) The car in question 1 drives the ECE-R40 drive cycle. Determine the torque required at the driving wheel (24" diameter) as s function of time. Graph the results indicating the torque associated with: Rolling load, Aerodynamic load, and Acceleration as well as the total.