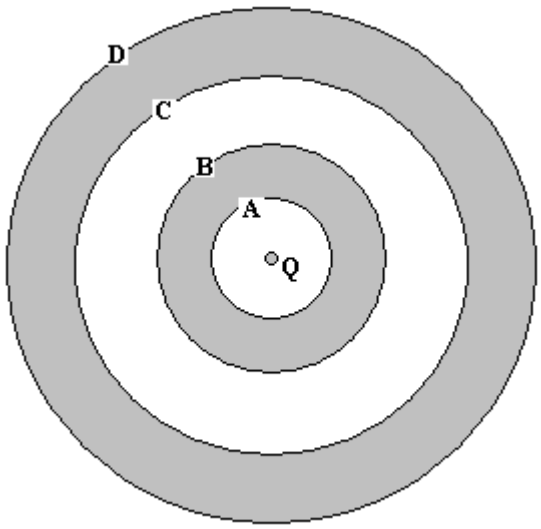
Physics 51 Proficiency Test 2(sample) **(Time: 10 minutes)** **25 points**

By Todd Sauke

Name _____**KEY**_____ Section # __**KEY**___

Two concentric, hollow, spherical conducting shells are placed as shown in the figure at right. A total charge of –200 nano-Coulombs (nC = 10^{-9} C) is placed on the outer conductor, a total charge of +500 nC is placed on the inner conductor, and a charge Q = -400 nC is placed at the very center. First, what is the magnitude of the E-field (at equilibrium)on the interior of each conductor?



_____**0**_____ N/C

What is the net charge on the **interior** of each conductor? _____**0**_____ C

Find the total charge on each of the surfaces shown; A, B, C, and D.

$q_A + Q = 0$ $q_A = -Q = -(-400\text{ nC})$

Charge on A ___**+400**___nC

$q_B + q_A = +500$ nC

$q_B = +500\text{ nC} - q_A = +500\text{ nC} - (400\text{ nC}) = +100$ nC

Charge on B ____**+100**__nC

$q_C + q_B + q_A + Q = 0$

$q_C = -q_B = -(100\text{ nC}) = -100$ nC

Charge on C ____**–100**__nC

$q_D + q_C = -200$ nC

$q_D = -200\text{ nC} - q_C = -200\text{ nC} - (-100\text{ nC}) = -100$ nC

Charge on D ____**–100**__nC