SP212
Quiz 3

For each of the following questions please write the most correct answer in using CAPITAL LETTERS in the space provided.

Question 1 Cross sections of three different Gaussian surfaces are shown below each of which enclose some point charges. Which of these surfaces has the greatest net electric flux going through it?

\[
\Phi_E = \frac{q_{\text{enc}}}{\varepsilon_0}
\]

A) Surface A has the most flux through it
B) Surface B has the most flux through it
C) Surface C has the most flux through it
D) Surface A and B have the same flux and are both greater than the flux through C
E) None of the above

Answer: E

Question 2 A charged particle is suspended at the center of two concentric spherical shells that are very thin and made of nonconducting material. Figure (a) shows a cross section. Figure (b) gives the net flux \( \Phi \) through a Gaussian sphere centered on the particle, as a function of the radius \( r \) of the sphere. The scale of the vertical axis is set by \( \Phi_S = 5 \times 10^5 \, Nm^2/C^2 \). In terms of \( \varepsilon_0 \), what is the total charge on shell B?

\[
q_B = \varepsilon_0 \Phi_{E1} - \varepsilon_0 \Phi_{E2} = \varepsilon_0 \times 10^5 \, Nm^2/C^2
\]

(A) \( \varepsilon_0 \times 10 \times 10^5 \, Nm^2/C^2 \)  B) \( \varepsilon_0 \times 9 \times 10^5 \, Nm^2/C^2 \)  C) \( \varepsilon_0 \times 8 \times 10^5 \, Nm^2/C^2 \)
D) \( \varepsilon_0 \times 7 \times 10^5 \, Nm^2/C^2 \)  E) \( \varepsilon_0 \times 6 \times 10^5 \, Nm^2/C^2 \)

Answer: A