KFUPM	Phys102-242	Quiz-0413
Physics Department	Sec:04-05-06	13-Apr-2025

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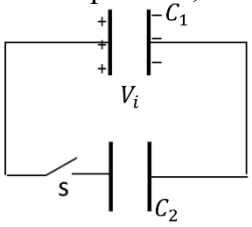
2 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 27 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 52 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 77 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 102 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

3 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 28 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 53 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 78 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 103 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Q1. The figure shows capacitor $C_1 = 10.7$ μF charged to a potential difference of $V_i = 32.1$ V and another uncharged capacitor $C_2 = 28.3$ μF. If you close the switch S to connect the two capacitors, find the new voltage V_f across the capacitors in the unit V.



A) 12.1
B) 23.3
C) 8.81
D) 84.9
E) 6.87

$q_i = q_{1f} + q_{2f}$

$C_1 V_i = C_1 V_f + C_2 V_f$

$V_f = \frac{C_1}{C_1 + C_2} V_i = \frac{10.7}{10.7 + 28.3} 32.1 = 8.81$ V

Q2. For a 3.45 pF air-filled parallel plate capacitor, it is desired to store 44.9 μJ energy with a potential difference of 573 V using a dielectric material between the plates. What is dielectric constant of the material to be filled between the plates?

A) 97.5
B) 79.3
C) 61.8
D) 53.9
E) 42.0

$U = \frac{KCV^2}{2} \Rightarrow K = \frac{2U}{CV^2} = \frac{2(44.9 \times 10^{-6})}{(3.45 \times 10^{-12})(573)^2}$

$= 79.3$

23 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 48 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 73 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 98 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 123 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

24 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 49 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 74 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 99 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 124 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

25 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 50 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 75 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 100 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 125 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ