

ELECTROSTATICS II

1. C
2. D
3. B
4. D

5.

Charge table

column answers:

Charge = 1.0×10^{-4} C

Value (1)
Unit (1)

Equivalent capacitance

Capacitance = $5.0 \mu\text{F}$ (1)

1
[Total 3m]

6.

a. Find the equivalent capacitance. [3m]

$$\frac{1}{C_s} = \frac{1}{3.0 \mu\text{F}} + \frac{1}{5.0 \mu\text{F}}; \quad \frac{1}{C_s} = \frac{5+3}{15 \mu\text{F}}; \quad C_s = \frac{15 \mu\text{F}}{8}; \quad \boxed{C_s = 1.9 \mu\text{F}}$$

b. Find the charge on each capacitor. [3m]

$q = C_s V$: $q = (1.9 \text{ mF})(12 \text{ V})$; $q = 23 \text{ mC}$

c. Find the potential drop (or voltage) across each capacitor. [3m]

$V = \frac{q}{C_1}$: $V = \frac{23 \mu\text{C}}{3.0 \mu\text{F}}$; $V = 7.7 \text{ V}$

$V = \frac{q}{C_2}$: $V = \frac{23 \mu\text{C}}{5.0 \mu\text{F}}$; $V = 4.6 \text{ V}$

[Total 9m]

7.

$$\frac{1}{C_s} = \frac{1}{5.0 \mu\text{F}} + \frac{1}{8.0 \mu\text{F}} + \frac{1}{6.0 \mu\text{F}} \quad \text{or} \quad C_s = \boxed{2.0 \mu\text{F}}$$

Formula 1m, answer 1m unit 1m
[3m]

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