

Physics II Review Trivia

Chapters 18-19 (Electric Forces, Fields, Potential, and Capacitors)

General Physics IIA

Instructions: Work in teams. Discuss each question and write your answer before time is called.

Round 1 — Quick Concept Warm-Up (1 point each)

1. Coulomb's law says the electric force between two charges varies with distance as

(A) $1/r$

☒ (B) $1/r^2$

(C) $1/r^3$

(D) independent of distance

2. If the distance between two charges is **tripled**, the electric force becomes

(A) three times larger

(B) one-third as large

☒ (C) one-ninth as large

(D) unchanged

3. Electric field lines around a **positive charge** point

(A) inward

☒ (B) outward

(C) tangent to circles

(D) randomly

4. True or False: ☒ False: Electric field lines can cross each other.

5. The **density of electric field lines** indicates

(A) electric potential

(B) electric force

☒ (C) electric field strength

(D) electric flux

6. Inside a conductor in electrostatic equilibrium, the electric field is

(A) maximum

(B) constant ~~OK~~

☒ (C) zero

(D) unknown

7. Where does excess charge reside on a conductor?

(A) evenly throughout the conductor

(B) only at the center

☒ (C) on the surface

(D) nowhere

8. Electric potential due to a point charge varies as

(A) $1/r^2$

☒ (B) $1/r$

(C) r

(D) constant

Round 2 — Multiple Choice Challenge (2 points each)

9. Two identical positive charges are placed near each other. The force between them is

(A) attractive

☒ (B) repulsive

(C) zero

(D) depends on distance only

10. If an electric field points to the **right**, a **negative charge** placed there experiences a force

(A) to the right

☒ (B) to the left

(C) upward

(D) zero

11. The electric field exactly **midway between two identical positive charges** is

- (A) zero
(B) toward the left charge
(C) toward the right charge
(D) infinite
12. Gauss' law states that the electric flux through a closed surface depends on
(A) surface area
(B) electric field strength only
(C) total enclosed charge
(D) distance from the charges
13. If the radius of a Gaussian sphere surrounding a point charge doubles, the electric flux
(A) doubles
(B) quadruples
(C) halves
(D) stays the same
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Round 3 — Estimation / Reasoning (2–3 points)

14. The electric field at distance r from a point charge is E . What is the electric field at distance $2r$? $E/4$
15. A $+3\mu C$ charge creates an electric field at some point. If a **negative charge** is placed there, will the force on it be **along or opposite** the electric field?
OPPOSITE
16. If the electric potential at distance r from a charge is V , what is the potential at $2r$? $V/2$
17. A capacitor's capacitance depends on which **three physical factors**?

d, A, k

Round 4 — Dielectric Round

18. Inserting a dielectric into a capacitor generally

- (A) increases capacitance
- (B) decreases capacitance
- (C) has no effect
- (D) reverses polarity

19. If a capacitor **remains connected to a battery** and a dielectric is inserted, what happens to the **voltage**?

NO CHANGE

20. If a capacitor is **disconnected from the battery** before inserting the dielectric, what happens to the **charge on the plates**?

CHARGE DECREASES

Final Round — Fast Physics

21. What is the SI unit of electric field? $\frac{N}{C}$ OR $\frac{V}{m}$

22. What is the SI unit of electric potential? V

23. What constant appears in Coulomb's law? ELECTROSTATIC CONSTANT, k

24. What physical quantity does **electric flux** conceptually measure?

THE NUMBER OF FIELD LINES THROUGH
A SURFACE

Tie Breaker

Estimate the electric field strength 1 m from a 1 C point charge.

$$V = k \frac{q}{r} = 9 \times 10^9 \frac{1}{1} = \underline{9 \times 10^9 \text{ V}}$$