



Degree: (B.Sc.)
Year/ Specialization: 1st Math and Phys.
Mid Exam
Course Title: Elec. and Magnetism

Examination Date: 6th Apr. 2025
Examination Time: 1 hour
Course code: PHYS
Number of Pages: 2 Pages

Choose the correct answer:

1. The law, governing the force between electric charges is known as

- | | | | |
|------------------|-------------------|-------------------|---------------|
| (a) Ampere's law | (b) Coulomb's law | (c) Faraday's law | (d) Ohm's law |
|------------------|-------------------|-------------------|---------------|

2. Electric Field: What is the unit of electric field strength?

- | | | | |
|---|------------------------------|----------------------|---------------|
| (a) Newton p(d) er coulomb square (N/C ²) | (b) Newton per coulomb (N/C) | (c) Both (a) and (b) | (d) Joule (J) |
|---|------------------------------|----------------------|---------------|

3. Gauss's Law: If the net flux through a closed surface is zero, which of the following statements is true?

- | | | | |
|---|-----------------------------------|--------------------------------|--|
| (a) Negative charges are present inside the surface | (b) The electric field is uniform | (c) The electric field is zero | (d) Equal positive and negative charges are enclosed |
|---|-----------------------------------|--------------------------------|--|

4. Coulomb's Law: The electrostatic force is:

- | | | | |
|-----------------------|----------------------|------------------------------|-----------------------------|
| (a) Always attractive | (b) Always repulsive | (c) Dependent on the charges | (d) Dependent on the masses |
|-----------------------|----------------------|------------------------------|-----------------------------|

5. Electric Field: The direction of the electric field is:

- | | | | |
|------------------------------|------------------------------|---------------------------------|---------------------------------|
| (a) Toward a positive charge | (b) Toward a negative charge | (c) Away from a positive charge | (d) Away from a negative charge |
|------------------------------|------------------------------|---------------------------------|---------------------------------|

6. If the electrostatic force between two charges 8 C and 4 C are separated by distance r is 12 N then find the distance r.

- | | | | |
|--------------------------|-------------------------|------------|-------------------------|
| (a) 15.5×10^3 m | (b) 155×10^3 m | (c) 1550 m | (d) 145×10^3 m |
|--------------------------|-------------------------|------------|-------------------------|

7. Coulomb's Law: The constant k in Coulomb's law depends on:

- | | | | |
|---------------------------|--------------------------------|----------------------------------|-----------------------|
| (a) The nature of charges | (b) The medium between charges | (c) The distance between charges | (d) None of the above |
|---------------------------|--------------------------------|----------------------------------|-----------------------|

8. Electric Field: An electric field exists in a region where:

- | | | | |
|------------------------|---|------------------------------|-----------------------|
| (a) There is no charge | (b) A positive charge produces potential energy | (c) A force acts on a charge | (d) None of the above |
|------------------------|---|------------------------------|-----------------------|

9. Gauss's Law: Which of the following shapes is most suitable for applying Gauss's law?

- | | | | |
|------------|----------|--------------|----------------------|
| (a) Sphere | (b) Cube | (c) Cylinder | (d) All of the above |
|------------|----------|--------------|----------------------|

10. Coulomb's Law: If the magnitude of two charges is tripled, the force between them:

- | | | | |
|---------------------------------|--------------------------------|----------------------------------|-----------------------|
| (a) Becomes nine times stronger | (b) Becomes six times stronger | (c) Becomes three times stronger | (d) Remains unchanged |
|---------------------------------|--------------------------------|----------------------------------|-----------------------|

11. Coulomb's Law: The force between two charges in a vacuum depends on:

- | | | | |
|---------------------------|-------------------------------|--|--|
| (a) Their magnitudes only | (b) Their distance apart only | (c) Both their magnitudes and the distance apart | (d) The gravitational force between them |
|---------------------------|-------------------------------|--|--|

12. Electric Field: A charge experiences a force of 4 N, in an electric field of 2 N/C. What is the charge magnitude?

(a) 2C	(b) 4C	(c) 6 C	(d) 8 C
13. Twelve identical charges, each of magnitude q , are positioned at the corners of a regular 12 sided polygon (such as on the positions of a clock face). What is the resultant force acting on a test charge Q placed at the center of the polygon?			
(a) 12 N	(b) 4 N	(c) Zero N	(d) 8 N
14. A point charge $+q$ is placed at origin. A second point charge $+9q$ is placed at distance (d) in cartesian coordinate system. The point in between them where the electric field vanishes is			
(a) d	(b) $d/4$	(c) $d/2$	(d) $2d$
15. Gauss's law is valid for			
(a) Any closed surface	(b) Only regular closed surface	(c) Only open surface	(d) Only irregular open surface
16. In comparison with the electrostatic force between two electrons, the electrostatic force between two protons is:			
(a) greater	(b) smaller	(c) zero	(d) same.
17. The position of the charge inside the enclosing surface is changed in such a way that the total charge remains constant. Then the total normal electric flux through the enclosing surface:			
(a) increases	(b) decreases	(c) Remains unchanged	(d) changes erratically
18. Force per unit charge is ____			
(a) Electric current	(b) Electric flux	(c) Electric field	(d) Electric potential
19. The electric field strength of a charge			
(a) Increases with distance	(b) Decreases with cube of distance	(c) Decreases with distance	(d) Decreases with square of distance
According to the vector form of Coulomb's Law, the force exerted by the two charges on each other is ____ but ____ in direction.			
(a) equal, opposite	(b) unequal, the same	(c) equal, the same	(d) unequal, opposite



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