الملف أوراق عمل الوحدة الأولى باللغة الانجليزية

موقع المناهج ⇐ المناهج الإماراتية ⇐ الصف الثاني عشر المتقدم ⇐ فيزياء ⇐ الفصل الأول

روابط مواقع التواصل الاجتماعي بحسب الصف الثاني عشر المتقدم

روابط مواد الصف الثاني عشر المتقدم على تلغرام

الرياضيات	اللغة الانجليزية	اللغة العربية	التربية الاسلامية

المزيد من الملفات بحسب الصف الثاني عشر المتقدم والمادة فيزياء في الفصل الأول	
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Practice[1].

1. The diagram below represents two electrically charged identical-sized metal spheres, A and B.

   (A)   (B)

   +2.0 × 10⁻⁷ C   +1.0 × 10⁻⁷ C

   If the spheres are brought into contact, which sphere will have a net gain of electrons?
   Ⓐ A, only
   Ⓑ B, only
   Ⓒ both A and B
   Ⓓ neither A nor B

2. Metal sphere A has a charge of -2 units and an identical metal sphere, B, has a charge of -4 units. If the spheres are brought into contact with each other and then separated, the charge on sphere B will be
   Ⓐ 0 units
   Ⓑ -2 units
   Ⓒ -3 units
   Ⓓ +4 units

3. If an object has a net negative charge of 4.0 coulombs, the object possesses
   Ⓐ 6.3×10^{18} more electrons than protons
   Ⓑ 2.5×10^{19} more electrons than protons
   Ⓒ 6.3×10^{18} more protons than electrons
   Ⓓ 2.5×10^{19} more protons than electrons

Base your answers to questions 4 and 5 on the information below

A lightweight sphere hangs by an insulating thread. A student wishes to determine if the sphere is neutral or electrostatically charged. She has a negatively charged hard rubber rod and a positively charged glass rod. She does not touch the sphere with the rods, but runs tests by bringing them near the sphere one at a time.

4. Describe the test result that would prove that the sphere is neutral
   _____
   _____
   _____

5. Describe the test result that would prove that the sphere is positively charged.
   _____
   _____
   _____

6. Oil droplets may gain electrical charges as they are projected through a nozzle. Which quantity of charge is *not* possible on an oil droplet?
   Ⓐ 8.0×10^{-19} C
   Ⓑ 4.8×10^{-19} C
   Ⓒ 3.2×10^{-19} C
   Ⓓ 2.6×10^{-19} C

7. A positive test charge is placed between an electron, e, and a proton, p, as shown in the diagram below.

   A
   Test charge
   (e)D   (+)   B(p)
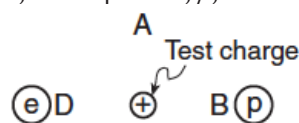
   C
   When the test charge is released, it will move toward
   Ⓐ A
   Ⓑ B
   Ⓒ C
   Ⓓ D

8. A metal sphere has a net negative charge of 1.1×10^{-6} coulomb. Approximately how many more electrons than protons are on the sphere?
   Ⓐ 1.8×10^{12}
   Ⓑ 5.7×10^{12}
   Ⓒ 6.9×10^{12}
   Ⓓ 9.9×10^{12}

9. A positively charged glass rod attracts object X. The net charge of object X
   Ⓐ may be zero or negative
   Ⓑ may be zero or positive
   Ⓒ must be negative
   Ⓓ must be positive

10. The charge-to-mass ratio of an electron is
    Ⓐ 5.69×10^{-12} C/kg
    Ⓑ 1.76×10^{-11} C/kg
    Ⓒ 1.76×10^{11} C/kg
    Ⓓ 5.69×10^{12} C/kg

11. What is the magnitude of the charge, in coulombs, of a lithium nucleus containing three protons and four neutrons?
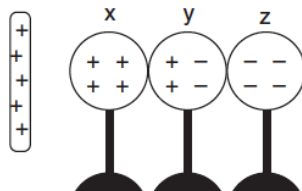   _____
    _____
    _____

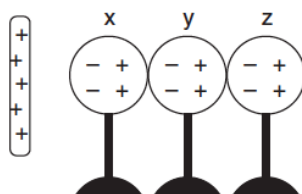12. The diagram below shows three neutral metal spheres, x, y, and z, in contact and on insulating stands.
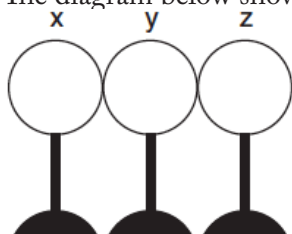
Which diagram best represents the charge distribution on the spheres when a positively charged rod is brought near sphere x, but does not touch it.
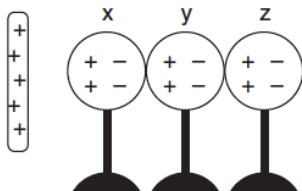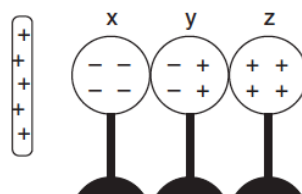

13. What is the net electrical charge on a magnesium ion that is formed when a neutral magnesium atom loses two electrons?
   Ⓐ -3.2×10^{-19} C
   Ⓑ -1.6×10^{-19} C
   Ⓒ $+1.6 \times 10^{-19}$ C
   Ⓓ $+3.2 \times 10^{-19}$ C

14. A negatively charged plastic comb is brought close to, but does not touch, a small piece of paper. If the comb and the paper are attracted to each other, the charge on the paper
   Ⓐ may be negative or neutral
   Ⓑ may be positive or neutral
   Ⓒ must be negative
   Ⓓ must be positive

15. An object possessing an excess of 6.0×10^6 electrons has a net charge of
   Ⓐ 2.7×10^{-26} C
   Ⓑ 5.5×10^{-24} C
   Ⓒ 3.8×10^{-13} C
   Ⓓ 9.6×10^{-13} C

16. When a neutral metal sphere is charged by contact with a positively charged glass rod, the sphere
   Ⓐ loses electrons
   Ⓑ gains electrons
   Ⓒ loses protons
   Ⓓ gains protons

17. Which quantity of excess electric charge could be found on an object?
   Ⓐ 6.25×10^{-19} C
   Ⓑ 4.8×10^{-19} C
   Ⓒ 6.25 elementary charges
   Ⓓ 1.60 elementary charges

18. A particle could have a charge of
   Ⓐ 0.8×10^{-19} C
   Ⓑ 1.2×10^{-19} C
   Ⓒ 3.2×10^{-19} C
   Ⓓ 4.1×10^{-19} C

19. A dry plastic rod is rubbed with wool cloth and then held near a thin stream of water from a faucet. The path of the stream of water is changed, as represented in the diagram below.
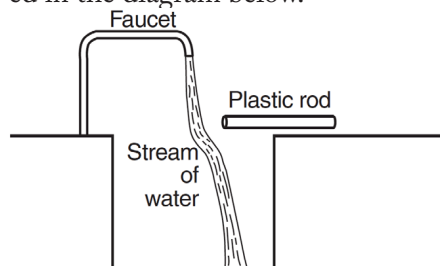

Which force causes the path of the stream of water to change due to the plastic rod?
   Ⓐ nuclear
   Ⓑ magnetic
   Ⓒ electrostatic
   Ⓓ gravitational
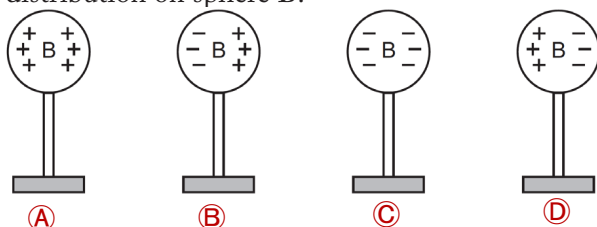
20. Which net charge could be found on an object?

  Ⓐ $+4.80 \times 10^{-19}$ C
  Ⓑ $+2.40 \times 10^{-19}$ C
  Ⓒ -2.40×10^{-19} C
  Ⓓ -5.60×10^{-19} C

21. Two identically-sized metal spheres, A and B, are on insulating stands, as shown in the diagram below. Sphere A possesses an excess of 6.3×10^{10} electrons and sphere B is neutral.
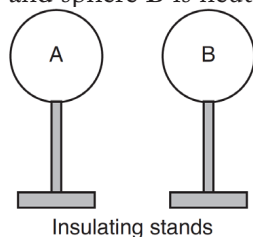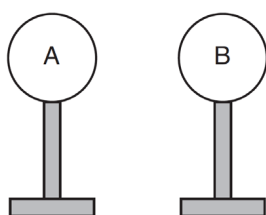

Insulating stands

Which diagram best represents the charge distribution on sphere B?

  Ⓐ   Ⓑ   Ⓒ   Ⓓ

22. Two identically-sized metal spheres on insulating stands are positioned as shown below. The charge on sphere A is -4.0×10^{-6} coulomb and the charge on sphere B is -8.0×10^{-6} coulomb.

-4.0×10^{-6} C -8.0×10^{-6} C
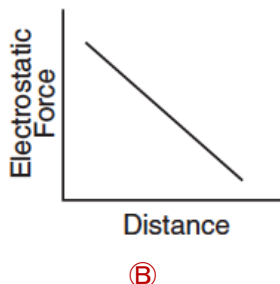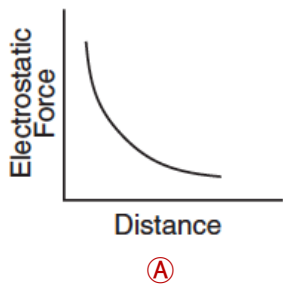

The two spheres are touched together and then separated. The total number of excess electrons on sphere A after the separation is
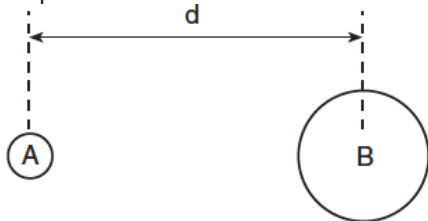
  Ⓐ 2.5×10^{13}
  Ⓑ 3.8×10^{13}
 Ⓒ 5.0×10^{13}
  Ⓓ 7.5×10^{13}

1. Which graph best represents the electrostatic force between an alpha particle with a charge of +2 elementary charges and a positively charged nucleus as a function of their distance of separation?

Ⓐ   Ⓑ   Ⓒ   Ⓓ
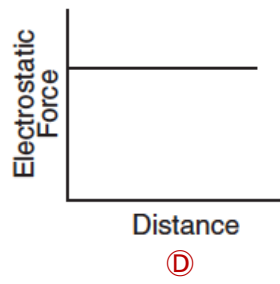
2. In the diagram below, two positively charged spheres, A and B, of masses m_A and m_B are located a distance d apart.


Which diagram best represents the directions of the gravitational force, F_g, and the electrostatic force, F_e, acting on sphere A due to the mass and charge of sphere B? [Vectors are not drawn to scale.]


Ⓐ
Ⓑ
Ⓒ
Ⓓ
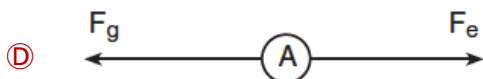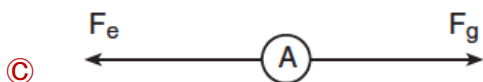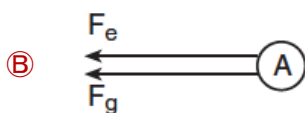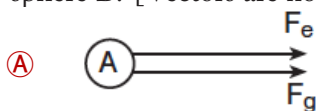
3. What is the magnitude of the electrostatic force between two electrons separated by a distance of 1.00×10^{-8} meter?
   Ⓐ 2.56×10^{-22} N
   Ⓑ 2.30×10^{-20} N
   Ⓒ 2.30×10^{-12} N
   Ⓓ 1.44×10^{-1} N

4. Two metal spheres, A and B, possess charges of 1.0 microcoulomb and 2.0 microcoulombs, respectively. In the diagram below, arrow F represents the electrostatic force exerted on sphere B by sphere A.

1.0 μC   2.0 μC
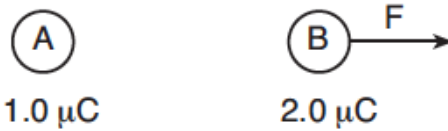
Which arrow represents the magnitude and direction of the electrostatic force exerted on sphere A by sphere B?


Ⓐ   Ⓑ   Ⓒ   Ⓓ
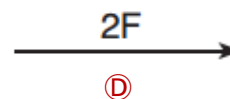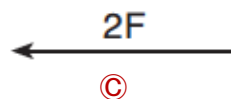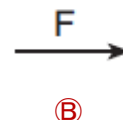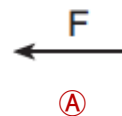
5. Two small identical metal spheres, A and B, on insulated stands, are each given a charge of $+2.0 \times 10^{-6}$ coulomb. The distance between the spheres is 2.0×10^{-1} meter. Calculate the magnitude of the electrostatic force that the charge on sphere A exerts on the charge on the sphere B. [Show all work, including the equation and substitution with units.]

Base your answers to questions 6 through 9 on the information below.

A force of 6.0×10^{-15} newton due south and a force of 8.0×10^{-15} newton due east act concurrently on an electron, e⁻.

6. On the diagram, draw a force diagram to represent the two forces acting on the electron. (The electron is represented by a dot.) Use a metric ruler and the scale of 1.0 centimeter = 1.0×10^{-15} newton. Begin each vector at the dot representing the electron and label its magnitude in newtons.

e⁻
●

N
W ←——|——→ E
S
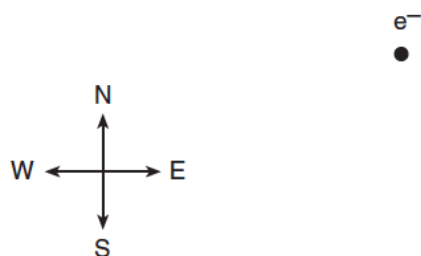
7. Determine the resultant force on the electron graphically. Label the resultant vector R.

8. Determine the magnitude of the resultant vector R.

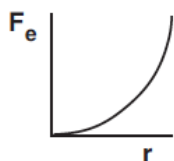9. Determine the angle between the resultant and the 6.0×10^{-15}-newton vector.
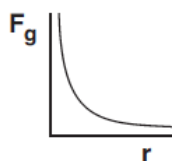
10. The distance between an electron and a proton is varied. Which pair of graphs best represents the relationship between gravitational force, F_g, and distance, r, and the relationship between electrostatic force, F_e, and distance, r, for these particles?
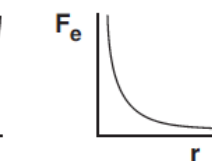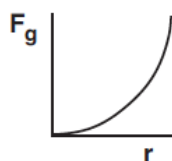
F_g | F_e
   r   r
   Ⓐ

F_g | F_e
   r   r
   Ⓒ

F_g | F_e
   r   r
   Ⓑ

F_g | F_e
   r   r
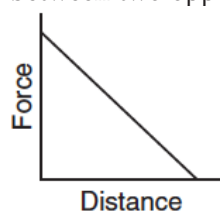   Ⓓ
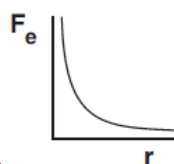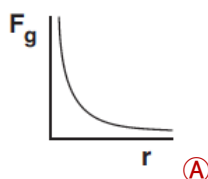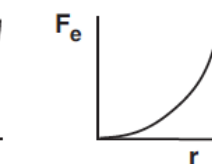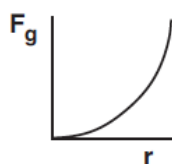
11. Which graph best represents the relationship between the magnitude of the electrostatic force and the distance between two oppositely charged particles?
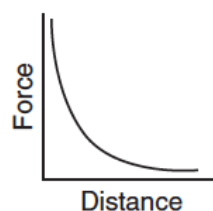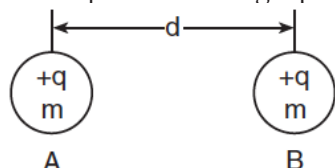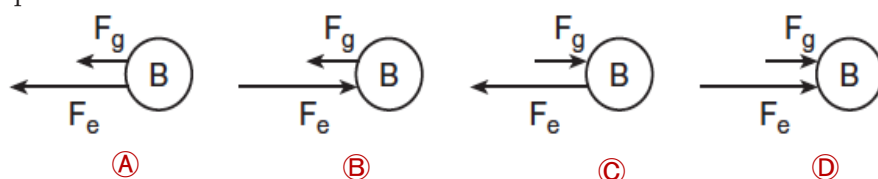

(A) (B) (C) (D)

12. The diagram below shows two identical metal spheres, A and B, separated by a distance d. Each sphere has mass m and possesses charge q.

Which diagram best represents the electrostatic force F_e and the gravitational force F_g acting on sphere B due to sphere A?
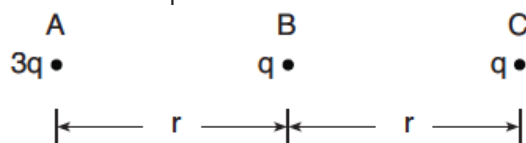

(A) (B) (C) (D)

13. The diagram below shows the arrangement of three small spheres, A, B, and C, having charges of 3q, q, and q, respectively. Spheres A and C are located distance r from sphere B.

Compared to the magnitude of the electrostatic force exerted by sphere B on sphere C, the magnitude of the electrostatic force exerted by sphere A on sphere C is

Ⓐ the same
Ⓑ twice as great
Ⓒ 3/4 as great
Ⓓ 3/2 as great

14. If the distance separating an electron and a proton is halved, the magnitude of the electrostatic force between these charges particles will be

Ⓐ unchanged
Ⓑ doubled
Ⓒ quartered
Ⓓ quadrupled

15. Two similar metal spheres, A and B, have charged of $+2.0 \times 10^{-6}$ coulomb and $+1.0 \times 10^{-6}$ coulomb, respectively, as shown in the diagram below.

$+2.0 \times 10^{-6}$ C $+1.0 \times 10^{-6}$ C

The magnitude of the electrostatic force on A due to B is 2.4 newtons. What is the magnitude of the electrostatic force on B due to A?
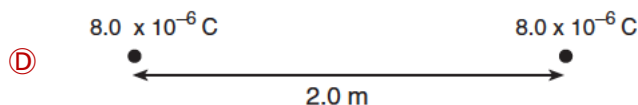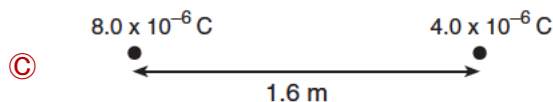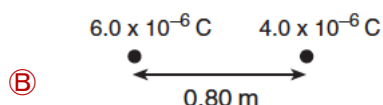
Ⓐ 1.2 N
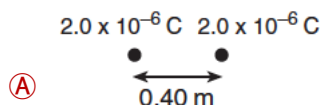Ⓑ 2.4 N
Ⓒ 4.8 N
Ⓓ 9.6 N

16. Two protons are located one meter apart. Compared to the gravitational force of attraction between the two protons, the electrostatic force between the protons is

Ⓐ stronger and repulsive
Ⓑ weaker and repulsive
Ⓒ stronger and attractive
Ⓓ weaker and attractive

17. The diagram below shows two small metal spheres, A and B. Each sphere possesses a net charge of 4.0 × 10^{-6} coulomb. The spheres are separated by a distance of 1.0 meter.

4.0×10^{-6} C $\qquad$ 4.0×10^{-6} C

A $\qquad$ 1.0 m $\qquad$ B
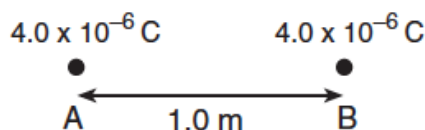
Which combination of charged spheres and separation distance produces an electrostatic force of the same magnitude as the electrostatic force between spheres A and B?

Ⓐ 2.0×10^{-6} C $\quad$ 2.0×10^{-6} C
0.40 m

Ⓑ 6.0×10^{-6} C $\quad$ 4.0×10^{-6} C
0.80 m

Ⓒ 8.0×10^{-6} C $\qquad$ 4.0×10^{-6} C
1.6 m

Ⓓ 8.0×10^{-6} C $\qquad$ 8.0×10^{-6} C
2.0 m

18. A balloon is rubbed against a student's hair and then touched to a wall. The balloon "sticks" to the wall due to
Ⓐ electrostatic forces between the particles of the balloon
Ⓑ magnetic forces between the particles of the wall
Ⓒ electrostatic forces between the particles of the balloon and the particles of the wall
Ⓓ magnetic forces between the particles of the balloon and the particles of the wall

19. The magnitude of the electrostatic force between two point charges is F. If the distance between the charges is doubled, the electrostatic force between the charges will become
Ⓐ F/4
Ⓑ 2F
Ⓒ F/2
Ⓓ 4F

20. In the diagram below, a positive test charge is located between two charged spheres, A and B. Sphere A has a charge of +2q and is located 0.2 meter from the test charge. Sphere B has a charge of -2q and is located 0.1 meter from the test charge.

A $\qquad$ Test charge $\qquad$ B
(+2q) $\qquad$ (+) $\qquad$ (-2q)
0.2 m $\qquad$ 0.1 m
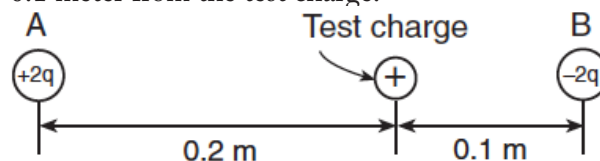
If the magnitude of the force on the test charge due to sphere A is F, what is the magnitude of the force on the test charge due to sphere B?
Ⓐ F/4
Ⓑ 2F
Ⓒ F/2
Ⓓ 4F

21. Two positively charged masses are separated by a distance, r. Which statement best describes the gravitational and electrostatic forces between the two masses?
Ⓐ Both forces are attractive.
Ⓑ Both forces are repulsive.
Ⓒ The gravitational force is repulsive and the electrostatic force is attractive.
Ⓓ The gravitational force is attractive and the electrostatic force is repulsive.

22. A distance of 1.0 meter separates the centers of two small charged spheres. The spheres exert gravitational force F_g and electrostatic force F_e on each other. If the distance between the spheres' centers is increased to 3.0 meters, the gravitational force and electrostatic force, respectively, may be represented as
Ⓐ $F_g/9$ and $F_e/9$
Ⓑ $F_g/3$ and $F_e/3$
Ⓒ $3F_g$ and $3F_e$
Ⓓ $9F_g$ and $9F_e$

Base your answers to questions 23 and 24 on the diagram below and on your knowledge of physics. The diagram represents two small, charged, identical metal spheres, A and B, that are separated by a distance of 2.0 meters.
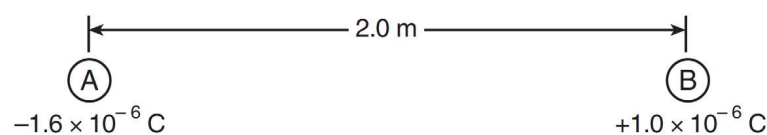
23. What is the magnitude of the electrostatic force exerted by sphere A on sphere B?
    Ⓐ 7.2×10^{-3} N
    Ⓑ 3.6×10^{-3} N
    Ⓒ 8.0×10^{-13} N
    Ⓓ 4.0×10^{-13} N

24. If the two spheres were touched together and then separated, the charge on sphere A would be
    Ⓐ -3.0×10^{-7} C
    Ⓑ -6.0×10^{-7} C
    Ⓒ -1.3×10^{-6} C
    Ⓓ -2.6×10^{-6} C

25. Two electrons are separated by a distance of 3.00×10^{-6} meter. What are the magnitude and direction of the electrostatic forces each exerts on the other?
    Ⓐ 2.56×10^{-17} N away from each other
    Ⓑ 2.56×10^{-17} N toward each other
    Ⓒ 7.67×10^{-23} N away from each other
    Ⓓ 7.67×10^{-23} N toward each other

26. When two point charges of magnitude q_1 and q_2 are separated by a distance r, the magnitude of the electrostatic force between them is F. What would be the magnitude of the electrostatic force between point charges $2q_1$ and $4q_2$ when separated by a distance of 2r?
    Ⓐ F
    Ⓑ 2F
    Ⓒ 16F
    Ⓓ 4F

27. When two point charges are a distance d apart, the magnitude of the electrostatic force between them is F. If the distance between the point charges is increased to 3d, the magnitude of the electrostatic force between the two charges will be
    Ⓐ F/9
    Ⓑ F/3
    Ⓒ 2F
    Ⓓ 4F