

Name: _____

KEY

Date: _____

Period: _____

Fields - Forces at a Distance Practice Test

Circle the best or most correct answer to the questions below.

Gravity

1. The path of the Earth orbiting the Sun is best described as

- A. elliptical
- B. parabolic
- C. circular
- D. quadratic
- E. linear

2. Your weight is _____ at the cruising altitude of an airplane compared to sea level.

- A. smaller
- B. greater
- C. the same
- D. unable to be determined

3. If an object weighs 800 N at the surface of Earth, what will the force of gravity be on it at a distance of $4R$?

- A. 800 N
- B. 400 N
- C. 200 N
- D. 50 N
- E. 3200 N

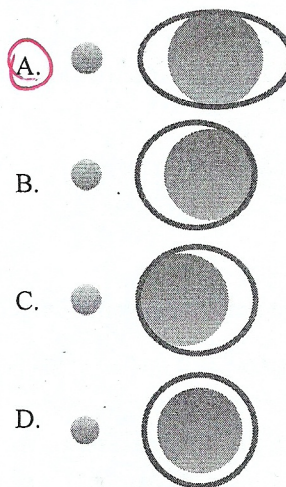
4. The reason the Moon does not crash into the Earth is that the

- A. Earth's gravitational field is weak at the Moon
- B. gravitational pull of other planets keeps the Moon up
- C. Moon has sufficient sideways, tangential speed
- D. Moon has less mass than the Earth
- E. none of the above

5. As the Earth orbits the Sun, it moves fastest when it is

- A. closest to the Sun
- B. furthest from the Sun
- C. moving towards the Sun
- D. moving away from the Sun
- E. the Earth always orbits at the same speed

6. Which best depicts the tides here on Earth?



7. Which of these scientists published the Law of Universal Gravitation?

- A. Tycho Brahe
- B. Galileo Galilei
- C. Isaac Newton
- D. Nicolaus Copernicus
- E. Aristotle

8. Which of the following is attributed to the Polish scientist Nicolaus Copernicus?

- A. Laws of Planetary Motion
- B. Determined the circumference of the Earth
- C. Heliocentric Model of the solar system
- D. Law of Universal Gravity
- E. Expanding Universe

9. Who determined that gravity is actually the curvature of spacetime?

- A. Isaac Newton
- B. Edwin Hubble
- C. Albert Einstein
- D. Tycho Brahe
- E. Johannes Kepler

10. A troll sitting atop a tall mountain feels 900 N of force due to gravity. The troll stares enviously at a distant mountain twice as tall as his own. If the troll were to climb to the top of that mountain, the force of gravity on the troll would be
- Twice as strong
 - Four times as strong
 - Half as strong
 - A fourth as strong
 - None of the above

11. An astronaut in orbit will experience an acceleration due to gravity that is
- Greater than g
 - Less than g
 - Equal to g
 - Zero

Electrostatics

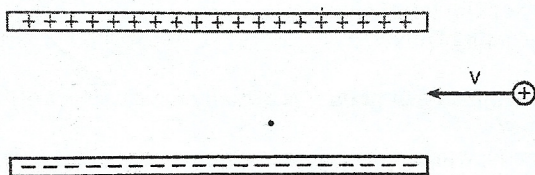
12. What is the magnitude and direction of the electric field 8.0 m to the left of a $+3.0 \mu\text{C}$ charge?
- 420 N/C to the right
 - 420 N/C to the left
 - 3,400 N/C to the right
 - 3,400 N/C to the left
 - none of the above

13. In the diagram below, A is a point near a positively charged sphere.



Which vector best represents the direction of the electric field at point A ?

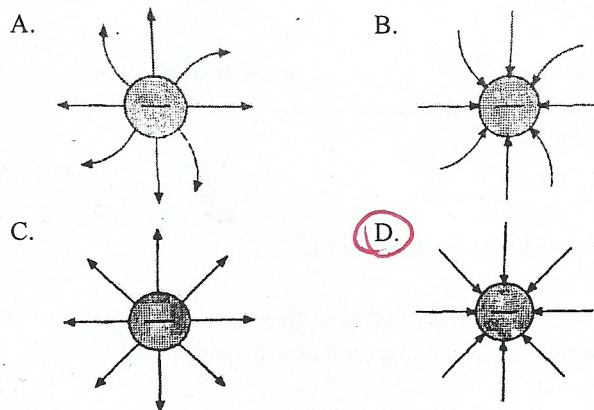
- ←
 -
 - ↑
 - ↓
14. The diagram below represents a positively charged particle about to enter the electric field between two oppositely charged plates.



The electric field will deflect the particle

- toward the top of the page
- into the page
- out of the page
- toward the bottom of the page
- the particle will not deflect

15. Which diagram best represents the electric field around a negatively charged conducting sphere?

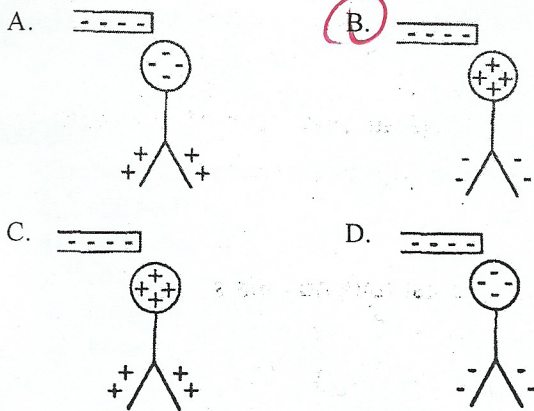


16. When a plastic rod is rubbed with wool, the wool acquires a positive charge because
- protons are transferred from the wool to the rod
 - electrons are transferred from the rod to the wool
 - electrons are transferred from the wool to the rod
 - protons are transferred from the rod to the wool

17. If the distance separating an electron and proton is doubled, the magnitude of the electrostatic force between them will
- quarter
 - halve
 - stay the same
 - double
 - quadruple

18. What is the approximate electrostatic force between two protons separated by a distance of $1.0 \times 10^{-6} \text{ m}$?
- $2.3 \times 10^{-16} \text{ N}$, attractive
 - $2.3 \times 10^{-16} \text{ N}$, repulsive
 - $9.0 \times 10^{21} \text{ N}$, attractive
 - $9.0 \times 10^{21} \text{ N}$, repulsive
 - none of the above

19. Which diagram best represents the charge distribution on a neutral electroscope when a negatively charged rod is held near it



20. Sphere A carries a charge of $+4$ coulombs and an identical sphere B is neutral. If the spheres touch one another and then are separated, the charge on sphere B would be

- A. $+1$ C
- B. $+2$ C
- C. 0 C
- D. $+4$ C
- E. none of the above

Magnetism

21. What produces a magnetic field?

- A. north and south poles
- B. charges
- C. the Earth's rotation
- D. moving charges
- E. none of the above

22. If you double the number of coils of current-carrying wire, what happens to the magnetic field it induces?

- A. it halves
- B. it quadruples
- C. it triples
- D. it fourths
- E. none of the above (it doubles)

23. What is the shape of the magnetic field lines induced by a straight, current-carrying wire?

- A. straight lines
- B. concentric circles
- C. spirals
- D. curved lines
- E. none of the above

24. Which of the following would increase the strength of the magnetic field produced by an electromagnet?

- A. increase the wire's resistance
- B. increase the number of coils
- C. decrease the voltage
- D. can't be done
- E. none of the above

25. Magnetic field lines move from

- A. positive to negative
- B. negative to positive
- C. south to north
- D. north to south
- E. none of the above

26. The voltage supplied by all standard American power outlets is

- A. 110 V
- B. 230 V
- C. 120 V
- D. we don't do voltage
- E. none of the above