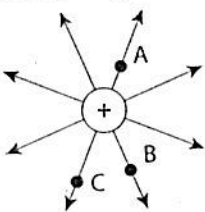
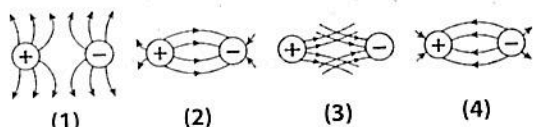
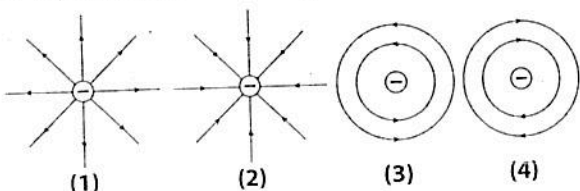



ELECTRIC FIELDS

Review Questions

18. What is the magnitude of the electrostatic force experienced by one elementary charge at a point in an electric field where the magnitude of the electric field strength is 3.0×10^3 newtons per coulomb?
- (1) 1.0×10^3 N (3) 3.0×10^3 N
 (2) 1.6×10^{-19} N (4) 4.8×10^{-16} N
19. The diagram below shows some of the lines of electric force around a positive point charge. The magnitude of the strength of the electric field is
- 
- (1) greatest at point A
 (2) greatest at point B
 (3) greatest at point C
 (4) equal at points A, B, and C
20. A charged particle is placed in an electric field E . If the charge on the particle is doubled, the magnitude of the force exerted on the particle by the field E is
- (1) unchanged (3) halved
 (2) doubled (4) quadrupled
21. Which diagram best illustrates the electric field around two unlike charges?
- 
- (1) (2) (3) (4)
22. Which diagram best represents the electric field of a point negative charge?
- 
- (1) (2) (3) (4)
23. How much energy is needed to move one electron through a potential difference of 1.0×10^2 volts?
- (1) 1.0 J (3) 1.6×10^{-17} J
 (2) 1.0×10^2 J (4) 1.6×10^{-19} J
24. In an electric field, 6.0 joules of work are done to move 2.0 coulombs of charge from point A to point B. Calculate the potential difference between points A and B.
25. A helium ion with a charge of $+2e$ is accelerated by a potential difference of 5.0×10^3 volts. What is the kinetic energy acquired by the ion?
- (1) 3.2×10^{-19} eV (3) 5.0×10^3 eV
 (2) 2.0 eV (4) 1.0×10^4 eV
26. Calculate the potential difference across a 6-ohm resistor if 4 joules of work are required to move 2 coulombs of charge through the resistor.
27. An electron is accelerated from rest through a potential difference of 200. volts. What is the work done on the electron in electronvolts?
28. The uniform electric field between two oppositely charged parallel plates does work on a series of small positively charged spheres in moving them from one plate to the other. The graph below represents the relationship between the work done on the spheres and their respective charges.
- 

What does the slope of the graph represent?

Electric Current

Electric current is the rate at which charge passes a given point in a circuit. Current is a scalar quantity. An **electric circuit** is a closed path along which charged particles move. A **switch** is a device for making, breaking, or changing the connections in an electric circuit. Figure 4-3 shows the symbol for a switch.

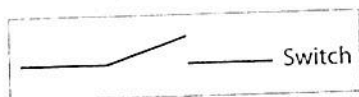



Figure 4-3. The symbol for a switch 

Unit of Current The SI unit of electric current, I , is the **ampere**, A. It is a fundamental unit. The coulomb, C, the unit of charge, is a derived unit defined to be the amount of charge that passes a point when a current of one ampere flows for one second. This relationship can be expressed as follows: