Multiple Choice

20.1 Magnetic Fields, Field Lines, and Force 22.

For a magnet, a domain refers to _____.

a. the region between the poles of the magnet
b. the space around the magnet that is affected by the magnetic field
c. the region within the magnet in which the magnetic poles of individual atoms are aligned
d. the region from which the magnetic material is mined

23.

In the region just outside the south pole of a magnet, the magnetic field lines _____.

a. point away from the south pole
b. go around the south pole
c. are less concentrated than at the north pole
d. point toward the south pole

24.

Which equation gives the force for a charge moving through a magnetic field?

a. F = qvB\sin \theta
b. F = I\ell B\sin \theta
c. F = I\ell B
d. F = qvB

25.

Can magnetic field lines cross each other? Explain why or why not.

a. Yes. Magnetic field lines can cross each other because the points where lines intersect indicate where the field changes direction.
b. No. Magnetic field lines cannot cross each other because the points where lines intersect would indicate that the field has multiple directions.

26.

True or false—If a magnet shatters into many small pieces, all the pieces will have north and south poles

a. true
b. false

20.2 Motors, Generators, and Transformers 27.

An electrical generator _____.

a. is a generator powered by electricity
b. must be turned by hand

c. converts other sources of power into electrical power
d. uses magnetism to create electrons

28.

A step-up transformer increases the

a. voltage from power lines for use in homes
b. current from the power lines for use in homes
c. current from the electrical generator for transmission along power lines
d. voltage from the electrical power plant for transmission along power lines

29.

What would be the effect on the torque of an electric motor of doubling the width of the current loop in the motor?

a. Torque remains the same.
b. Torque is doubled.
c. Torque is quadrupled.
d. Torque is halved.

30.

Why are the coils of a transformer wrapped around a loop of ferrous material?

a. The magnetic field from the source coil is trapped and also increased in strength.
b. The magnetic field from the source coil is dispersed and also increased in strength.
c. The magnetic field from the source coil is trapped and also decreased in strength.
d. Magnetic field from the source coil is dispersed and also decreased in strength.

20.3 Electromagnetic Induction 31.

What does *emf* stand for?

a. electromotive force
b. electro motion force
c. electromagnetic factor
d. electronic magnetic factor

32.

Which formula gives magnetic flux?

a. \frac{\mu _{0}I}{2\pi r}
b. qvB\sin\, \theta
c. {-N}\frac{\Delta \Phi }{\Delta t}
d. BA\cos \theta

33.

What is the relationship between the number of coils in a solenoid and the emf induced in it by a change in the magnetic flux through the solenoid?

a. The induced emf is inversely proportional to the number of coils in a solenoid.
b. The induced emf is directly proportional to the number of coils in a solenoid.
c. The induced emf is inversely proportional to the square of the number of coils in a solenoid.
d. The induced emf is proportional to the square of the number of coils in a solenoid.

34.

True or false—If you drop a bar magnet through a copper tube, it induces an electric current in the tube.

a. false
b. true