AP Physics 2 Algebra Based: Unit - 5 - Magnetism and Electromagnetic Induction Practice Test

Question 1
An 8cm wire with a current of 2A is oriented 36° from parallel to a magnetic field with a strength of 6T. What is the force on the wire?
    A. 2.96 N
    B. 1.77 N
    C. 0.564 N
    D. 0.926 N

Question 2
A substance whose relative permeability is less than the permeability of free space is?
    A. Paramagnetic
    B. Diamagnetic
    C. Ferromagnetic
    D. None of the above

Question 3
A large magnet is broken into two pieces so that the lengths are in the ratio 2:1.the pole strength of the two pieces will have ratio
    A. 1:2
    B. 1:1
    C. 3:2
    D. 2:1

Question 4
A circuit contains a 60V battery and a 20Ω resistor in series. Determine the magnitude of the magnetic force outside of the loop 2mm away from the wire on an electron that is stationary.
    A.  $5 x 10^{-18}$  N
    B.  $3.5 x 10^{-7}$  N
    C.  $4.3 x 10^{-10}$  N
    D. None of these

Question 5
Find the magnetization of the field which has a magnetic moment 16 units in a volume of 1.2 units.
    A. 13.33
    B. 16.67
    C. 18.37
    D. 15.16

Question 6

As the temperature increases beyond the Curie temperature, the relative susceptibility of ferromagnetic materials?

    A. Increases
    B. Decreases
    C. Remains the same
    D. Becomes zero
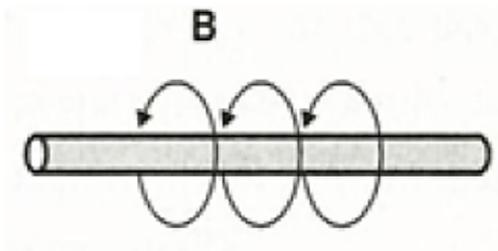
Question 7

Gauss law for magnetism is _____.

    A. The net magnetic flux through any closed surface is B · Δ s
    B. The net magnetic flux through any closed surface is E · Δ s
    C. Both A and B
    D. The net magnetic flux through any closed surface is zero.

Question 8

A wire carries a current, creating a magnetic field around itself as shown. The current in the wire is:



    A. Directed to the right
    B. Equal to the magnetic field
    C. Directed to the left
    D. In the same direction as the magnetic field

Question 9

600 loops of current carrying wire form a solenoid of length 600 m that carries 3 A and have radius 45 cm. Determine the magnetic field at the center of the solenoid.

    A. $3.77 \, x \, 10^{-3}$ T
    B. $8.44 \, x \, 10^{-3}$ T
    C. $2.60 \, x \, 10^{-3}$ T
    D. $6.25 \, x \, 10^{-3}$ T

Question 10

What is the force experienced by a 15μC charge moving at 6.2 $x \, 10^{7} \frac{m}{s}$ through a magnetic field with strength 7T at 48° from perpendicular to the field?

A. 1337 N
B. 6510 N
C. 4838 N
D. 3134 N

Question 11
A circular circuit is powered by a 9 V battery. How will the magnetic field change if a second 9 V battery is added in the same direction as the first?
   A. The magnetic field will double in magnitude and have the same direction
   B. The magnetic field will become zero
   C. The magnetic field will stay the same
   D. The magnetic field will quadruple

Question 12
A force on a conductor carrying a current is 1.32 N, the current is 4 A, and the length is 3.88 m, what is the magnetic flux density?
   A. 0.0851
   B. 0317
   C. 0.106
   D. 1.17

Question 13
How strong would a magnetic field need to be in order to make a particle with a mass of 4x $10^{-11}$ kg and a charge of 8nC move in a circular path with a speed of 400 $\frac{m}{s}$ and a radius of 0.5m?
   A. 4x $10^{3}$ T
   B. 4x $10^{6}$ T
   C. 4x $10^{-9}$ T
   D. 4 T

Question 14
A piece of metal has a motional emf of $\varepsilon=25mV$ is moving through a magnetic field going into the page (depicted by the x's) with a magnitude of 0.5T. The length of the metal piece (vertical length as opposed to horizontal length) is 2cm. Find the magnitude of the velocity of the object.
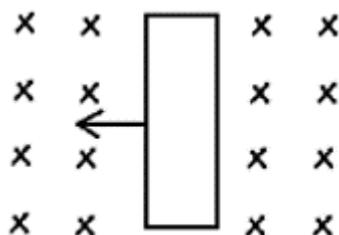
A.   $v=5.14\dfrac{m}{s}$

B.   $v=1.23\dfrac{m}{s}$

C.   $v=2.5\dfrac{m}{s}$

D.   $v=3.74\dfrac{m}{s}$

Question 15
A 5 C charge moving at 6 m/s toward the bottom of the page encounters a 12 T magnetic field pointed toward the right of the page. What is the magnetic force acting on the charge?
   A.  360 N into the page
   B.  150 N into the page
   C.  150 N out of the page
   D.  360 N out of the page

Question 16
If the north end of a magnetic points towards the geographic North Pole, that means that the geographic North Pole is a magnetic _____ pole.
   A.  Electrical
   B.  South
   C.  Mono
   D.  North

Question 17
An electric dipole is put in north-south direction in a sphere filled with water. Which statement is correct?
   A.  Electric flux entering into sphere and leaving the sphere are same
   B.  Electric flux is coming towards sphere
   C.  Electric flux is coming out of sphere
   D.  Water does not permit electric flux to enter into sphere.

Question 18
What is the magnetic moment of a field with current 12A and area 1.6 units?
   A.  21.9
   B.  12.9
   C.  19.2
   D.  18.7

Question 19
The magnetic flux density is 0.45 T, the current is 1.37 A, and the length is1.9 m, what is the force on a conductor carrying a current?
   A.  3.45

B.  1.06
C.  2.87
D.  1.17

Answer Key
1. C
2. B
3. B
4. D
5. A
6. B
7. D
8. C
9. A
10. C
11. A
12. A
13. D
14. C
15. D
16. B
17. A
18. C
19. D