

1. What is the magnetic field strength we need to set a proton in motion?

- A.  $4 \cdot 10^{-4} \text{ T}$
- B. 0
- C.  $3 \cdot 10^{-2} \text{ T}$
- D.  $5 \cdot 10^{-3} \text{ T}$

2. The work done by the magnetic force on a moving charged particle is

- A.  $qvB$
- B.  $2\pi qvBR$
- C.  $vBR$
- D. 0

3. The magnetic field strength is measured in

- A.  $T$ , Tesla
- B.  $V/m$ , Volts per meters
- C.  $Wb$ , Weber
- D.  $T/m^2$ , Tesla per square meters

4. The speed of a charged particle with mass  $m$  and charge  $q$  in a magnetic field  $B$  is  $v$ . Calculate the radius  $R$  of the circular orbit of the particle. (Hint: The magnetic force on the charged particle equals the centripetal force. Calculate from there the speed of the particle.)

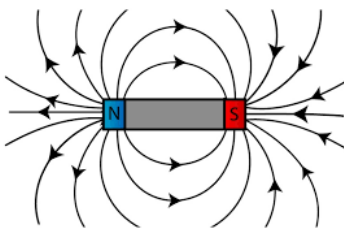
- A.  $R = \frac{mv}{2qB}$
- B.  $R = \frac{mv^2}{qB}$
- C.  $R = \frac{mv}{qB}$
- D.  $R = \frac{mv}{4qB}$

5. A magnetic field of magnitude  $B$  is exerted on two charges,  $q_1 = Q$  and  $q_2 = 4Q$  moving in circular orbits with identical speeds  $v$ . What is the ratio  $F_1/F_2$  of the magnetic forces exerted on the two charges?

- A. 1/2
- B. 4
- C. 2
- D. 1/4

6. Which one of the following will not experience a force when placed in a magnetic field?

- A. piece of plastic
- B. iron nail
- C. paperclip
- D. steel spoon



7. What do the lines around the magnet shown above represent?

- A. North pole
- B. South pole
- C. Magnetic declination
- D. Magnetic field

8. In un-magnetized materials the domains are \_\_\_\_ aligned.

- A. super
- B. slightly
- C. randomly
- D. always



9. The strongest part of a magnet is

- A. at the bars
- B. the force field
- C. at the poles
- D. in the middle

10. The arrows of magnetic field lines

- A. always leave the North pole and point to the South pole
- B. always point to the middle of the magnet
- C. always leave the South pole and point to the North pole
- D. always point to both the North and South pole

11. The magnetic force between two parallel wires carrying currents in opposite directions is always

- A. repulsive if the currents are identical
- B. repulsive
- C. attractive if the currents are identical
- D. attractive

12. A very long wire carries a current of  $10\text{ A}$ . What is the magnetic field strength at a distance  $20\text{ m}$  away from the wire?

- A.  $10^{-6}\text{ T}$
- B.  $10^{-7}\text{ T}$
- C.  $10^{-8}\text{ T}$
- D.  $10^{-9}\text{ T}$

13. A very long wire carries a current of  $2\text{ A}$ , and is placed in a magnetic field  $B = 4\text{ T}$ , which forms an angle of  $90^\circ$  with the direction of the current. What is the magnitude of the magnetic force per unit length exerted on the wire?

- A.  $8\text{ N/m}$
- B.  $6\text{ N/m}$
- C.  $4\text{ N/m}$
- D.  $4\text{ N/m}$

14. When the right-hand rule is applied to find the magnetic force on a wire, when it carries a current and is inside a magnetic field, the direction of the current corresponds to

- A. the pointer
- B. the third finger
- C. the thumb
- D. none of the above

15. The current on a circular wire of radius  $4\pi\text{ m}$  is  $10\text{ A}$ . What is the magnitude of the magnetic field at the center of the circle?

- A.  $10^{-7}\text{ T}$
- B.  $5 \cdot 10^{-6}\text{ T}$
- C.  $5 \cdot 10^{-7}\text{ T}$
- D.  $10^{-6}\text{ T}$

16. The magnetic force between two parallel wires carrying currents in the same direction is always
- A. repulsive if the currents are identical
  - B. repulsive
  - C. attractive if the currents are identical
  - D. attractive
17. Two co-centric circular loops of radii of 5 m and 10 m carry currents of 2 A and 20 A respectively, both counterclockwise. What is the direction of the resultant magnetic field at the common center of the loops?
- A. parallel to the plane of the loops and upward
  - B. vertical to the plane of the loops and downward
  - C. parallel to the plane of the loops and downward
  - D. vertical to the plane of the loops and upward
18. What is the magnitude of the resultant magnetic field at the center of the loops in question 17?
- A.  $2.1\pi 10^{-7} T$
  - B.  $4.8\pi 10^{-7} T$
  - C.  $2.1\pi 10^{-6} T$
  - D.  $4.8\pi 10^{-6} T$
19. By which instrument the presence of a magnetic field at a point can be detected?
- A. a compass needle
  - B. a strong magnet
  - C. a solenoid
  - D. a current carrying wire
20. In the Earth's magnetic field, the compass needle rests along which direction?
- A. North-East
  - B. East-West
  - C. South-North
  - D. Not fixed direction
21. How can you find the direction of the magnetic field from a magnetic field line?
- A. along the perpendicular to the field line
  - A. along the parallel to the field line
  - C. along the tangent at any point of the field line
  - D. the information is not enough
22. Due to the current flows in a straight wire, the magnetic field line is a(n)
- A. square
  - B. ellipse
  - C. circle
  - D. parabola
23. When the direction of the current flows in a wire is reversed, the magnetic field produced by the current
- A. is also reversed
  - B. forms right angle with the current
  - C. doesn't reverse
  - D. forms  $45^\circ$  with the current
24. If we break a magnet, what we get is
- A. two magnets
  - B. four magnets
  - C. three magnets
  - D. one magnet
25. The magnetic field lines are
- A. continuous open curves
  - B. continuous closed circles
  - C. continues parabolas
  - D. continuous closed curves

