1. The force that acts on a current-carrying wire placed in a magnetic field is:

a) Parallel in direction to the magnetic field

b) Perpendicular in direction to the magnetic field

c) Both A & B

d) None of the above

According to right hand rule, It is always perpendicular to the direction of electric current and magnetic field.

2. Around a straight current carrying conductor the direction of magnetic fields is:

a) Straight **b) circular**

c) Both A and B d) none of these

Around a straight current carring conductor β is circular.

3. To find B around straight current carrying conductor we use relation:

a) B = $\mu_\circ$nI

b) B = $\mu_\circ \frac{N}{L}$ I

c) Both A and B

d) B = $\frac{\mu_\circ I}{2\pi r}$

Simplified form of Ampers law for straight conductor is

B = $\frac{\mu_\circ i}{2\pi r}$

4. For a straight current carrying conductor what is true?

a) B is zero inside but E ≠ 0
b) B is non zero outside but E ≠ 0
c) Both are zero inside
d) Both A and B

For a straight current carrying conductor inside it is ‘E’ whereas outside is ‘B’

5. A charge particle enters parallel to B in a region then the magnetic force acting on it will be

a) Maximum **b) zero**

c) Half of maximum d) none of these

Use relation ; F_B = qvBsin θn $\therefore \Rightarrow \theta = 0^{\circ}$

6. For a current carrying solenoid the term ‘n’ has unit as:

a) $\boldsymbol{m^{-1}}$ b) m^{-3}

c) m^{-2} d) no units

$$N = \frac{N}{L}$$

7. If for a current carrying solenoid the current is doubled and length is halved then the new magnetic field becomes:

a) B = 2B

b) B = 4B

c) B = $\frac{B}{4}$

d) B =B

Use B = $\mu_\circ \frac{N}{L}$ I

8. The direction of B inside a current carrying solenoid is:

a) From south to north b) from north to south

c) Both a and b d) none of these

Inside solenoid B is from south towards north.

9. DMM shows the values with:

a) Decimal
b) polarity
c) Units
d) all of these

DMM gives reading in decimal with polarity and units.

10. Magnetism at the centre of a bar magnet is

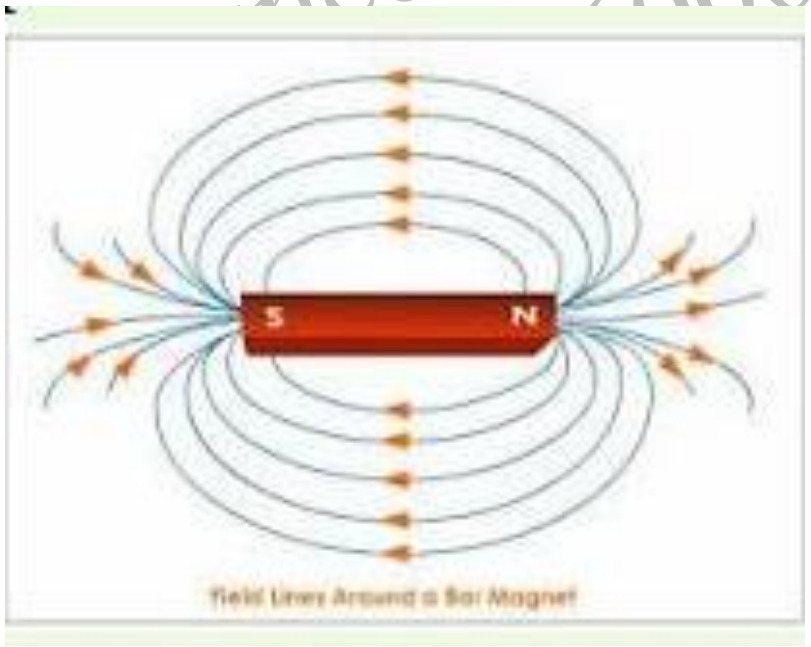
A. minimum

B. maximum

C. zero

D. minimum or maximum

Magnetism at the centre of a bar magnet is zero. i.e option c since it can be explained by that the magnetic field lines are originated fom pole and do not at centre.



11. A current in a wire directed towards east and a wire is placed in a magnetic field directed to the north, the force on the wire is:

A) Due east
B) Due south
C) Vertically downward
D) Vertically upward

The current in wire is directed towards east and the wire is placed in magnitude field directed towards north. The direction of the force on this wire is vertically upwards.

12. The force exerted on a wire of one-meter length carrying one ampere current at a right angle to the field is equal to:

A) Magnetic induction

B) Magnetic field strength

C) Flux density

D) Magnetic flux

13. An electron travels due north through a vacuum in a region of uniform magnetic field B that is also directed due north. It will:

A) Be unaffected by the field

B) Speed up

C) Slow down

D) Follow a right-handed corkscrew path

$$F = qvB\sin 0^0 = 0$$

14. A power line lies along the east-west direction and carries a current of 10 ampere . The force per meter due to the earth's magnetic field of $10^{-4}T$ tesla is:

A) 10^{-5} N **B)** 10^{-4} N **C)** 10^{-3} N **D)** 10^{-2} N

$F = B \times I \times L \times \sin A$

Where, B is the magnetic field, I is the current,L is the length of wire and A is the angle between the magnetic field and the current flow.

Now,

$A = 90^{\circ}$ as the south-westward direction which is perpendicula to the earth magnetic field.

$L = 1$

Thus the required force,

$F = B \times I = 0.001 \times 10 = 10^{-3}N$

15. A cyclotron operates with a given magnetic field orbit, the final particle energy is proportional to:

A) I/R

B) R

C) R^2

D) R^3

K. E = $\frac{1}{2}mv^2$ v = Rw

K. E = $\frac{1}{2}mR^2w^2$

16. The strength of the magnetic field around a straight conductor:

A) Is the same everywhere around the conductor

B) Obeys the inverse square law

C) Is directly proportional to the square of the distance from the conductor

D) None of these

The magnetic field due to straight conductor is given as $B = \frac{\mu_o I}{2\pi r}$ where r is distance of any point P from the straight conductor, at which we want to calculate the magnetic field, which is inversely proportional to r.

17. Two identical coils carry equal currents have a common centre and their planes are at right angles to each other. The ratio of the magnitude of the resultant magnetic field at the centre and the field due to one coil is :

A) 2:1 B) 1:2 C) $\sqrt{2}$: 1 D) 1 : $\sqrt{2}$

The magnetic field due to each coil is equal in magnitude and perpendicular to each other

Let magnetic field due to one of them be B

Then the resultant magnetic field due to 2 coil = $\sqrt{B^2 + B^2} = \sqrt{2}B$

The ratio of the magnitude of the resultant magnetic field at the centre and the field due to one coil = $\sqrt{2}B : B = \sqrt{2} : 1$

18. A body is charged by rubbing it; its weight:

A) Decreases

B) Increases

C) May increase or decrease

D) Remains the same

If a body is charged by rubbing it, then it may lose or gain electrons. Since electrons have a mass of. So, a slight weight may increase or decrease slightly.

20. The magnetic lines of force, like electric lines of force:

A) Are closed

B) Are not closed

C) Are open

D) Are not open

Both electric and magnetic lines of force are closed curves.

21. The magnetic force that two parallel wires with unequal currents flowing in opposite directions exert on each other are:

A) Attractive and unequal in magnitude

B) Repulsive and unequal in magnitude

C) Attractive and equal in magnitude

D) Repulsive and equal in magnitude

When two parallel wires with unequal currents flowing in opposite directions are placed near each other, they exert a **repulsive** force on each other. The magnitude of the force is proportional to the product of the currents and inversely proportional to the distance between the wires. The force is also dependent on the direction of the currents

22. At any point, the magnetic field lines are in the direction of:

A) The magnetic force on a moving positive charge

B) The magnetic force on a moving negative charge

C) The velocity of a moving positive charge

D) None of the above

23. Electromagnetism consists of how many number of fields?

A) 2 B) 3 C) 4 D) 5

24. Which of the following law defines electromagnetic based phenomena?

A) Lorentz force

B) Newton’s law

C) Ohms law

D) All the above

25. What happens to strength of magnetic field when current is controlled?

A) Increases

B) Decreases

C) Controlled

D) Zero

26. What happen to currents magnitude when magnetic fields strength changes?

A) Same B) Zero C) Infinity **D) Changes**

27. Magnetic field is a ___ type of field?

A) Scalar

B) Vector

C) Both a and b

D) None of the above

28. A wire carrying a current is bent into a loop. the magnetic field is strongest:

A) North pole

B) Motor

C) Its center

D) Generator

The magnetic field stronger inside the loop than outside because the fields overlap inside the loop. C is the right answer

29. The magnetism of a permanent magnet results from _____

a) Interactions with Earth's magnetic field.

b) The magnetic moments of nuclei in the material making up the magnet.

c) Macroscopic electric current through the magnet.

d) The magnetic moments of electrons in the material making up the magnet

The magnetism in a permanent magnet results from magnetic moments of electrons in the material making up the magnet. Each atom(circulating charges) the material is a tiny bar of magnet. d is the right answer.

30. The magnetic field about a straight length of current-carrying wire is

a) Circular in shape

b) Oval in shape

c) Square in shape

d) Straight line

The magnetic field lines around a straight current carrying conductor are in form of concentric circles.

31. When an iron rod is placed inside a current-carrying coil of wire:

a) The changing magnetic field that produces it alternates

b) North or South pole - no difference really

c) The coil becomes a stronger electromagnet

d) Similar of that to an interior bar magnet

32. In an electromagnetic wave, the electric field and magnetic fields.

a) Always in phase

b) Always in anti-phase

c) Always at 90 degrees phase difference

d) Always at 45 degrees phase difference

33. According to your textbook, electric field lines are sometimes called:

a) Push lines

b) Lines of force

c) Electric lines

d) All of these

34. A magnetic field CANNOT:

A) Exert a force on a charged particle

B) Change the velocity of a charged particle

C) Change the momentum of a charged particle

D) Change the kinetic energy of a charged particle

35. An electron is moving in the north direction. It experiences a force in the vertically upward direction. The magnetic field in that region is towards?

a) East b) West c) North d) South

36. What are the dimensions of flux?

a) $[\mathbf{ML^2T^{-2}I^{-1}}]$ b) $[ML^{-3}T^{-1}]$

c) $[ML T^{-2}]$ d) $[ML^3T^{-2}I^{-1}]$

$$\phi = BA$$

$$B = \frac{F}{IL}$$

37. If length of solenoid is doubled while keeping N (NUMBER OF TURNS) constant, the resultant magnetic field will be?

a) B/2 b) B/4 c) 2B d) B/3

$$B = \frac{\mu_0 NI}{L}$$

38. F = ILB, what is relation between I and L:

a) Direct
b) Inverse
c) Inverse of square
d) None of these

39. Magnetic effect of electric current as first discovered by:

a) Faraday **b) Oersted**

c) Henry d) None of these

40.

A charged particle is traveling through a uniform magnetic field. Which of the following statements are true of the magnetic field? There may be more than one correct statement

A It exerts a force on the particle parallel to the field.

B It exerts a force on the particle along the direction of its motion.

C It increases the kinetic energy of the particle.

D It exerts a force that is perpendicular to the direction of motion.

E It does not change the magnitude of the momentum of the particle.

Magnetic force is only deflecting force does not change magnitude of momentum and acts perpendicular to motion of charged particle as $F = q(v \times B)$

So statement D and E are correct.