## CHAPTER 1: ELECTRICITY AND MAGNETISM FUNDAMENTALS

1. Who discovered the relationship between magnetism and electricity that serves as the foundation for the theory of electromagnetism?
   A. Luigi Galvani
   **B. Hans Christian Oersted**
   C. Andre Ampere
   D. Charles Coulomb

2. Who demonstrated the theory of electromagnetic induction in 1831?
   **A. Michael Faraday**
   B. Andre Ampere
   C. James Clerk Maxwell
   D. Charles Coulomb

3. Who developed the electromagnetic theory of light in 1862?
   A. Heinrich Rudolf Hertz
   B. Wilhelm Rontgen
   **C. James Clerk Maxwell**
   D. Andre Ampere

4. Who discovered that a current-carrying conductor would move when placed in a magnetic field?
   **A. Michael Faraday**
   B. Andre Ampere
   C. Hans Christian Oersted
   D. Gustav Robert Kirchhoff

5. Who discovered the most important electrical effects which is the magnetic effect?
   **A. Hans Christian Oersted**
   B. Sir Charles Wheatstone
   C. Georg Ohm
   D. James Clerk Maxwell

6. Who demonstrated that there are magnetic effects around every current-carrying conductor and that current-carrying conductors can attract and repel each other just like magnets?
   A. Luigi Galvani
   B. Hans Christian Oersted
   C. Charles Coulomb
   **D. Andre Ampere**

7. Who discovered superconductivity in 1911?
   **A. Kamerlingh Onnes**
   B. Alex Muller
   C. Geory Bednorz
   D. Charles Coulomb

8. The magnitude of the induced emf in a coil is directly proportional to the rate of change of flux linkages. This is known as
   A. Joule's Law
   **B. Faraday's second law of electromagnetic induction**
   C. Faraday's first law of electromagnetic induction
   D. Coulomb's Law

9. Whenever a flux inking a coil or current changes, an emf is induced in it. This is known as
   A. Joule's Law
   B. Coulomb's Law
   **C. Faraday's first law of electromagnetic induction**
   D. Faraday's second law of electromagnetic induction

10. The force of attraction or repulsion between two magnetic poles is directly proportional to their strengths.
   A. Newton's first law
   B. Faraday's first law of electromagnetic induction
   **C. Coulomb's first law**
   D. Coulomb's second law

11. The force of attraction or repulsion between two magnetic poles is inversely proportional to the square of the distance between them. This is known as
    A. Newton's first law
    B. Faraday's first law of electromagnetic induction
    C. Coulomb's first law
    **D. Coulomb's second law**

12. Whenever a conductor cuts magnetic flux, an emf is induced in it. This is known as
    A. Coulomb's law
    B. Joule's law
    **C. Faraday's law**
    D. Ohm's law

13. A law that states that the polarity of the induced voltage will oppose the change in magnetic flux causing the induction.
    A. Joule's law
    B. Faraday's law
    C. Coulomb's law
    **D. Lenz' law**

14. A law that states that the current in a thermionic diode varies directly with the three-halves power of anode voltage and inversely with the square of the distance between the electrodes, provided operating conditions are such that the current is limited only by the space charge.
    A. Hall's law
    B. Joule's law
    **C. Child's law**
    D. Coulomb's law

15. States that the ratio of the thermal conductivity is proportional to the absolute temperature for all metals.
    A. Wien's displacement law
    B. Hartleys law
    C. Hall's law
    **D. Wiedemann Franz law**

16. A law establishing the fact that the algebraic su of the rises and drops of the mmf around a closed loop of a magnetic circuit is equal to zero.
    A. Kirchhoff's circuital law
    B. Maxwell's circuital law
    **C. Ampere's circuital law**
    D. Coulomb's circuital law

17. The net electrical charge in an isolated system remains constant. This is known as
    **A. Law of conservation of charge**
    B. Coulomb's first law
    C. Coulomb's second law
    D. Law of conservation of energy

18. Lenz's law is the consequence of the law of conservation of
    **A. Energy**
    B. Charge
    C. Field lines
    D. Momentum

19. Lenz' law states that the direction of the induced emf and hence current
    A. Is determined by the rate of current flux
    B. Is found by the right hand rule
    C. Is found by the left hand rule
    **D. Always opposes the cause producing it**

20. If you hold the conductor with right hand so that the stretched thumb points in the direction of the current, then encircling fingers will give the direction of magnetic lines of force round the conductor. This is known as
    A. Left hand cork screw rule
    B. Right hand cork screw rule
    C. Left hand rule
    **D. Right hand rule**

21. If the right handed bottle-opener cork screw is assumed to be along the conductor so as to advance in the direction of current flow, the motion of its handle will indicate the direction of magnetic flux produced around the conductor. This is known as
    A. Right hand rule
    B. Left hand rule
    C. **Cork screw rule**
    D. End rule

22. If on looking at any one end of a solenoid; the direction of current flow is found to be clockwise then the end under observation is a south pole. This is known as
    A. Right hand rule
    B. Left hand rule
    C. Cork screw rule
    **D. End Rule**

23. If the solenoid is gripped by the right hand with the fingers pointing the direction of current flow, the outstretched thumb will then point the north pole. This is known as
    A. Right hand rule
    B. **Helix rule**
    C. End rule
    D. Cork screw rule

24. The process by which an emf and hence current is generated or induced in a conductor when there is a change in the magnetic flux linking the conductor is called
    A. **Electromagnetic induction**
    B. Mutual induction
    C. Faraday's law
    D. Electromagnetic interference

25. The emf induced in a coil due to the change of its own flux linked with it is called
    A. Mutually induced emf
    B. Dynamically induced emf
    C. Statically induced emf
    D. **Self induced emf**

26. The emf induced in a coil due to the changing current of another neighboring coil is called
    **A. Mutually induced emf**
    B. Self induced emf
    C. Statically induced emf
    D. Dynamically induced emf

27. When a conductor is stationary and the magnetic field is moving or changing the emf induced is called
    **A. Statically induced emf**
    B. Mutually induced emf
    C. Self induced emf
    D. Dynamically induced emf

28. The magnetic potential in a magnetic circuit can be measured in terms of
    **A. Mmf**
    B. Emf
    C. Farad
    D. Coulomb

29. A substance that attracts pieces iron
    A. Conductor
    B. Semiconductor
    **C. Magnet**
    D. All of the above

30. The phenomenon by which a subtracts pieces of iron
    **A. Magnetism**
    B. Electromagnetism
    C. Naturalism
    D. Materialism

31. Which of the following is a natural magnet?
    A. Steel
    B. Magnesia
    **C. Lodestone**
    D. Soft iron

32. Define as that pole which when placed in air from a similar and equal pole repels it with a force of newtons
    A. North pole
    B. South pole
    C. **Unit pole**
    D. Magnetic pole

33. The point in a magnet where the intensity of magnetic lines of force is maximum
    A. **Magnetic pole**
    B. South pole
    C. North pole
    D. Unit pole

34. The straight line passing through the two poles of magnet is called
    A. Real axis
    B. Cartesian axis
    C. **Magnetic axis**
    D. Imaginary axis

35. The branch of Engineering which deals with the magnetic effect of electric current is known as
    A. Magnetism
    B. **Electromagnetism**
    C. Electrical engineering
    D. Electronics engineering

36. The space outside the magnet where its pole have a force of attraction or repulsion on a magnetic pole is called
    A. **Magnetic field**
    B. Electric field
    C. Electromagnetic field
    D. Free Space Field

37. The total number of magnetic lines of force in a magnetic field is called
    A. **Magnetic flux**
    B. Magnetic flux density
    C. Magnetic flux intensity
    D. Magnetic potential

38. The phenomenon by which a magnetic substance becomes a magnet when it is place near a magnet
    A. Magnetic effect
    B. Magnetic phenomenon
    C. **Magnetic induction**
    D. Electromagnetic induction

39. Which of the following magnetic materials can be easily magnetized in both direction?
    A. **Soft magnetic materials**
    B. Hard magnetic materials
    C. High hysteresis loss materials
    D. Low hysteresis loss materials

40. Which of the following materials has permeability slightly less than that of free space?
    A. Paramagnetic
    B. Non- magnetic
    C. Ferromagnetic
    D. **Diamagnetic**

41. Materials whose permeabilities are slightly greater than that of free space
    A. **Paramagnetic**
    B. Non- magnetic
    C. Ferromagnetic
    D. Diamagnetic

42. Materials that have very high permeabilities (hundreds and even thousands times of that of free space)
    A. Paramagnetic
    B. Non- magnetic
    C. **Ferromagnetic**
    D. Diamagnetic

43. The current of electric circuit is analogous to which quantity of a magnetic circuit
    A. Mmf
    B. **Flux**
    C. Flux density
    D. Reluctivity

44. What is the diameter of an atom?
    A. **About 10^-10 m**
    B. About 10^-10 cm
    C. About 10^-10 mm
    D. About 10^-10 µm

45. Defined as a closed path in which magnetic induction or flux flows
    A. Electric circuit
    B. **Magnetic circuit**
    C. Electronic circuit
    D. Electromagnetic circuit

46. The force which set ups or tends to set up magnetic flux in a magnetic circuit
    A. Dynamic force
    B. Electromotive force
    C. Potential difference
    D. **Magnetomotive force**

47. Referred to as the specific reluctance of a material
    A. Resistivity
    B. **Reluctivity**
    C. Conductivity
    D. Permeability

48. The property of a material which opposes the creation of magnetic flux in it
    A. Resistance
    B. **Reluctance**
    C. Permeance
    D. Conductance

49. It is the reciprocal of reluctance and implies the case of readiness with which magnetic flux is developed.
    A. Resistance
    B. Conductance
    C. **Permeance**
    D. Inductance

50. The ability of a material to conduct magnetic flux through it.
    A. Permittivity
    B. Reluctivity
    C. Conductivity
    **D. Permeability**

51. The ratio of the permeability of material to the permiabiity of air or vacuum.
    **A. Relative permeability**
    B. Relative permittivity
    C. Relative conductivity
    D. Relative reluctivity

52. Permeance is analogous to
    **A. Conductance**
    B. Reluctance
    C. Admittance
    D. Resistance

53. The property of magnetic materials of retaining magnetism after withdrawal of the magnetizing force is known as
    **A. Retentivity**
    B. Reluctivity
    C. Resistivity
    D. Conductivity

54. The quantity of magnetism retained by a magnetic material after withdrawal of the magnetizing force is called
    A. Leftover magnetism
    B. Hysteresis
    **C. Residual magnetism**
    D. Coercivity

55. The amount of magnetizing force to counter balance the residual magnetism of a magnetic material is referred to as
    A. Reluctivity
    B. Susceptivity
    **C. Coercivity**
    D. Retentivity

56. The ratio of the total flux (flux in iron path) to the useful flux (flux in air gap)
    A. Leakage flux
    B. Leakage current
    C. Leakage coefficient
    **D. Leakage factor**

57. Defined as the number of lines per unit area through any substance in a plane at right angles to the lines of force
    A. Flux
    B. Flux lines
    **C. Flux density**
    D. Flux intensity

58. Defined as the flux density produced in it due to its own induced magnetism
    A. Magnetic field intensity
    B. Electric field intensity
    C. Electromagnetic field intensity
    **D. Intensity magnetization**

59. The force acting on a unit n- pole placed at that point is called
    **A. Magnetic field intensity**
    B. Electric field intensity
    C. Electromagnetic field intensity
    D. Intensity magnetization

60. The ratio between the intensity of magnetization produced in a substance to the magnetizing force producing it
    A. Magnetic Reluctivity
    B. Magnetic Resistivity
    **C. Magnetic susceptibility**
    D. Magnetic conductivity

61. The lagging effect between flux density of the material and the magnetizing force applied
    A. Permeance
    B. Eddy current
    **C. Hysteresis**
    D. Reluctance

62. Refers to the magnetic lines
    A. **Flux**
    B. Hysteresis
    C. Current
    D. Magnetomotive force

63. Refers to the non- metallic materials that have the ferromagnetic properties of iron.
    A. **Ferrites**
    B. Ferromagnetic
    C. Diamagnetic
    D. Paramagnetic

64. The air space between poles of magnets
    A. **Air gap**
    B. Free space
    C. Vacuum
    D. Atmosphere

65. One that has magnetic poles produced by internal atomic structure with no external current necessary
    A. Diamagnetic
    B. **Permanent magnets**
    C. Paramagnetic
    D. Electromagnetic

66. Magnetic effects of the earth as a huge magnet with north and south poles.
    A. Diamagnetic
    B. Ferromagnetic
    C. **Terrestrial magnetism**
    D. Terrestrial ferromagnetism

67. Used to maintain strength of magnetic field
    A. Container
    B. Air gap
    C. **Keeper**
    D. Source

68. All magnetic field originates from
    A. **moving electric charge**
    B. Iron atoms
    C. Magnetic domain
    D. Permanent magnets

69. Magnetic fields do not interact with
    A. Moving permanent magnets
    B. Stationary permanent magnets
    C. Moving electric charges
    D. **Stationary electric charges**

70. The magnetic field inside a solenoid
    A. is zero
    B. **is uniform**
    C. increases with distance from the axis
    D. decreases with distance from the axis

71. When the ferromagnetic substance is inserted in a current- carrying solenoid, the magnetic field is
    A. Greatly decreased
    B. **Greatly increased**
    C. Slightly decreased
    D. Slightly increased

72. The magnetic field of a bar magnet most closely resembles the magnetic field of
    A. a horseshoe magnet
    B. a straight current- carrying wire
    C. a stream of electrons moving parallel to one another
    D. **a current- carrying wire loop**

73. The magnetic field of a magnetized iron bar when strongly heated
    A. **Becomes weaker**
    B. Becomes stronger
    C. Reverses in direction
    D. is unchanged

74. A permanent magnet does not exert a force on
    A. an unmagnetized iron bar
    B. a magnetized iron bar
    C. a moving electric charge
    **D. a stationary electric charge**

75. A current if flowing east along a power line. If the earth's field is neglected, the direction of the magnetic field below it is
    **A. North**
    B. South
    C. East
    D. West

76. The emf produced in a wire by its motion across a magnetic field does not depend upon the
    **A. Diameter of the wire**
    B. Length of the wire
    C. Orientation of the wire
    D. Flux density of the field

77. The induced emf in a wire loop that is moved parallel to a uniform magnetic field is
    **A. Zero**
    B. Dependent on the area of the loop
    C. Dependent on the shape of the loop
    D. Dependent on the magnitude of the field

78. When a wire loop is rotated in a magnetic field the direction of the induced emf changes one in every _____ revolution
    A. 1/3
    **B. 1/2**
    C. 1/4
    D. 2/3

79. The magnetic flux through a wire loop in a magnetic field does not depend on
    A. The area of the loop
    B. The magnitude of the field
    **C. The shape of the loop**
    D. The angle between the plane of the loop and the direction

80. Steel is hard to magnetize because of its
    A. **Low permeability**
    B. High permeability
    C. High density
    D. High retentivity

81. Paramagnetic substance has a relative permeability of
    A. Slightly less than one
    B. Equal to one
    C. **Slightly equal to one**
    D. Very much greater than one

82. A group of magnetically aligned atoms is called
    A. Range
    B. Lattice
    C. **Domain**
    D. Crystal

83. The force between two magnetic poles varies with the distance between them. The variation is _____ to the square of that distance.
    A. Equal
    B. Greater than
    C. Directly proportional
    D. **Inversely proportional**

84. Permeability means
    A. **The conductivity of the material for magnetic lines of force**
    B. The magnetization test in the material after exciting field has been removed
    C. The strength of an electromagnet
    D. The strength of the permanent magnet

85. _____ is an electromagnet with its core in the form of a close magnetic ring.
    A. Solenoid
    B. Paraboloid
    C. **Toroid**
    D. Cycloid

86. A magnetic material losses its ferromagnetic properties at a point called
    A. **Curie temperature**
    B. Inferred absolute temperature
    C. Room temperature
    D. Absolute temperature

87. Small voltages generated by a conductor with current in an external magnetic field.
    A. Skin effect
    B. Magnetic effect
    C. **Hall effect**
    D. Flywheel Effect

88. The emission of electrons from hot bodies is called
    A. Radiation effect
    B. **Edison effect**
    C. Skin effect
    D. Half effect

89. The ability of a mechanically stressed ferromagnetic wire to recognize rapid switching of magnetization when subjected to a dc magnetic field.
    A. Wartheim effect
    B. Wiedemann effect
    C. **Wiegand effect**
    D. Edison effect

90. An effect which is generally used in the gausameter to measure flux density.
    A. Skin effect
    B. Magnetic effect
    C. **Hall effect**
    D. Flywheel effect

91. The contribution to the ionization in an ionization chamber by electrons liberated from the walls.
    A. Skin effect
    B. **Walt effect**
    C. Hall effect
    D. Edison effect

92. The tiniest element of matter
    **A. Atom**
    B. Proton
    C. Electron
    D. Neutron

93. All matters (gas, liquid and solid) are composed of
    A. Neutrons
    B. Particles
    C. Electrons
    **D. Atoms**

94. The simplest type of atom to exist is the _____ atom.
    A. Helium
    **B. Hydrogen**
    C. Boron
    D. Oxygen

95. What revolves about the positive nucleus in a definite orbit?
    A. Atom
    B. Proton
    **C. Electron**
    D. Neutron

96. The uncharged particles which have no effect on its atomic charge.
    A. Nucleons
    B. Electrons
    C. Protons
    **D. Neutrons**

97. The diameter of a hydrogen atom is approximately _____ cm.
    A. 1.1 x 10^-6
    B. 1.1 x 10^-7
    **C. 1.1 x 10^-8**
    D. 1.1 x 10^-9

98. The K shell or the first shell has how many permissible number of orbiting electrons?
A. 1
B. **2**
C. 3
D. 4

99. Germanium atom has _____ protons and _____ electrons.
A. **32, 32**
B. 32, 42
C. 42, 32
D. 34, 34

100. A germanium atom has an atomic weight of 72. How many neutrons are there?
A. 32
B. **40**
C. 34
D. 36

101. How many neutrons does a copper atom have?
A. 32
B. 33
C. **34**
D. 29

102. Bonding of atoms that is due to the force of attraction between positive ions and a group of negative ions
A. Ionic bond
B. Covalent Bond
C. Electrostatic Bond
D. **Metallic bond**

103. An alloy of 22 percent iron and 78 per cent nickel.
A. **Permalloy**
B. Alnico
C. Constantan
D. Manganin

104. An alloy of 40 percent iron and 60 percent nickel.
A. Alnico
B. Permalloy
**C. Hipernik**
D. Manganin

105. A commercial alloy of aluminum nickel, and iron with cobalt, copper and titanium added to produce about 12 grades.
**A. Alnico**
B. Brass
C. Aluminum
D. Constantan

106. The idea of preventing one component from affecting another through their common electric and magnetic field is referred to as
A. Hall effect
B. Grounding
**C. Shielding**
D. Limiting

107. The physical motion resulting from the forces of magnetic fields is called
**A. Motor action**
B. Rotation
C. Repulsion
D. Torque action

108. Flux linkages equals
A. Flux times area of core
B. Flux times number of turns times area of core
C. Flux times number of turns times length of core
**D. Flux times number of turns**

109. Which of the following is a vector quantity?
A. Magnetic potential
**B. Magnetic field intensity**
C. Magnetic permeability
D. Flux density

110. Which of the following electric quantities is vector in character?

A. **Field**

B. Charge

C. Energy

D. Potential Difference

111. The quantity 10^6 maxwells is equivalent to one

A. **Weber**

B. Gauss

C. Gilbert

D. Tesla

112. What is the unit of reluctance?

A. Maxwell

B. Gauss

C. **At/Wb**

D. Weber

113. What is the SI unit of magnetic flux?

A. Tesla

B. **Weber**

C. Maxwell

D. Gauss

114. What is the unit of magnetomotive force?

A. Volt

B. Tesla

C. **Ampere- turn**

D. Weber

115. What is the cgs unit of magnetomotive force?

A. **Gilbert**

B. Ampere- turn

C. Maxwell

D. Weber

116. The unit of flux is _____ in cgs system.
   A. Tesia
   B. Gilbert
   C. **Maxwell**
   D. Oersted

117. Flux density is measured in
   A. **Tesia**
   B. Weber
   C. Ampere- turn
   D. Maxwell

118. The customary energy unit in atomic and nuclear physics is
   A. Joule
   B. Volt- coulomb
   C. **electron-volt**
   D. Walt- second

119. One ampere- turn is equivalent to _____ gilberts
   A. 1.16
   B. **1.26**
   C. 1.36
   D. 1.46

120. The magnetic flux of 2000 lines is how many Maxwells?
   A. 1000
   B. **2000**
   C. 4000
   D. 8000

121. How much is the flux in Weber in the above problem?
   A. **2 x 10^-5**
   B. 2 x 10^-3
   C. 2 x 10^5
   D. 2 x 10^3

122. One oersted (Oe) is equivalent to _____ Gb/cm.

A. **1**

B. 10

C. 100

D. 1000

123. One electron volt (1 eV) is equivalent to _____ joules

A. 1.3 x 10^-19

B. 1.4 x 10^-19

C. 1.5 x 10^-19

D. **1.6 x 10^-19**

124. An electron- volt (eV) is a unit of

A. **Energy**

B. Potential difference

C. Charge

D. Momentum

125. The unit of electrical energy is

A. Joule

B. Watt- second

C. Kilowatt- hour

D. **All of these**

126. Electrons at the outer shell are called

A. Outer shell electrons

B. Inner shell electrons

C. Semiconductor electrons

D. **Valence electrons**

127. Which of the following has the least number of valence electrons?

A. **Conductor**

B. Semiconductor

C. Insulator

D. Semi- insulator

128. A good conductor has how many valence electrons?

**A. 1**

B. 4

C. 2

D. 8

129. Which element has four valence electrons?

A. Conductor

B. Insulator

**C. Semiconductor**

D. Semi- insulator

130. A negative ion results when an atom gains an additional

**A. Electron**

B. Proton

C. Neutron

D. Atom

131. An atom or a group of atoms that carries a net electric charge.

A. Positive ion

B. Negative ion

**C. Ion**

D. Electron

132. Hysteresis refers to the _____ between flux density of the material and the magnetizing force applied.

A. Leading effect

B. Ratio

C. Equality

**D. Lagging effect**

133. Hydrogen is an example of a _____ material.

A. Paramagnetic

**B. Diamagnetic**

C. Ferromagnetic

D. Non- magnetic

134. Cobalt is an example of a _____ material.
   A. Paramagnetic
   B. Diamagnetic
   **C. Ferromagnetic**
   D. Non- magnetic

135. The evaporation of electrons from a heated surface is called
   A. Radiation
   B. Convection
   **C. Thermionic emission**
   D. Conduction

136. Electron is a Greek word for
   **A. amber**
   B. Fire
   C. Stone
   D. Heat

137. Gases whose particles are charged are known as
   A. Conductors
   B. Insulators
   C. Gaseous Conductors
   **D. Plasma**

138. What principle states that each electron in an atom must have a different set of quantum numbers?
   A. Inclusion principle
   **B. Exclusion principle**
   C. Quantum principle
   D. Electron principle

139. The energy stored in an electrostatic field or electromagnetic field is called
   A. Electromagnetic energy
   B. Kinetic energy
   **C. Potential energy**
   D. Rest energy

140. Which of the following statements is TRUE?
A. Silicon dioxide is a good
**B. The current carriers in conductors are valence electrons**
C. For conductors, the valence electron are strongly attracted to the nucleus
D. The valence electrons are located in the nucleus of an atom

141. How many electrons are needed in the valence orbit to give a material's stability?
**A. 8**
B. 4
C. 6
D. 5

142. Residual magnetism refers to the flux density, which exists in the iron core when the magnetic field intensity is
A. Minimized
**B. Reduced to zero**
C. Maximize
D. Unity

143. Magnetic intensity is a
A. Phasor quantity
B. Physical quantity
C. Scalar quantity
**D. Vector quantity**

144. The core of a magnetic equipment uses a magnetic material with
A. Least permeability
B. Low permeability
C. Moderate permeability
**D. High permeability**

145. Which of the following is a paramagnetic material?
A. Carbon
B. Copper
C. Bismuth
**D. Oxygen**

146. The permeability of permalloy is

A. **Very much greater than permeability of air**

B. Slightly greater than permeability of air

C. Slightly less than permeability of air

D. Equal to the permeability of air

147. A t/m is a unit of

A. Mmf

B. Emf

C. Reluctance

D. **Magnetizing force**

148. The force between two magnetic poles is _____ their poles strength.

A. equal to

B. **directly proportional to**

C. inversely proportional to

D. directly proportional to the square root of

149. The magnetic energy stored in an inductor is _____ current.

A. Directly proportional to

B. Inversely proportional to

C. **Directly proportional to the square of**

D. Inversely proportional to the square of

150. One of the common application of an air- cored choke.

A. **Radio frequency**

B. Audio frequency

C. Power supply

D. Power transformer

151. How is mutual inductance between two coils decreased?

A. By using a common core

B. By moving the coils closer

C. **By moving the coils apart**

D. By increasing the number of turns of either coil

152. A magnetic field is
   A. The current flow through space around a permanent magnet
   **B. The force set up when current flows through a conductor**
   C. The force that drives current through a resistor
   D. The force between the plates of a charged capacitor

153. Ohm's law can be used only to a _____ circuit or component.
   A. Unilateral
   B. Exponential
   C. Trivalent
   **D. Linear**

154. When the current flows, the magnetic field ……. conductor is in what direction?
   A. The same as the current direction
   B. Opposite the current direction
   C. Omnidirectional
   **D. In the direction determined by the left hand rule**

155. The magnetic field around the conductor is determined by the
   A. Size of the conductor
   **B. Amount of current**
   C. Current divided by the resistance
   D. Resistance divided by the current

156. Back emf refers to the
   A. Current equal to the applied emf
   B. Opposing emf
   C. Current opposing the applied emf
   **D. Voltage opposing the applied emf**

157. The magnetic flux through a coil changes. This results to the induced emf acting in a direction as to
   **A. Oppose the change**
   B. Aid the change
   C. Either oppose or aid the change
   D. Neither oppose nor aid the change

158. A magnetic flux of 2.5 x10^4 Wb through an area of 5 x10^4 square meters results in
A. 5 Wb
**B. 0.5 Tesia of flux density**
C. 5x 10^-5 Wb of flux
D. 5000 Tesia of flux density

159. If a 20 V potential is applied across a relay coil with 50 turns having 1 Ω of resistance, the total magnetomotive producing magnetic flux in the circuit is
A. 10 Wb
B. 50 T
C. 1000 A t/m
**D. 1000 A.t**

160. What is the reluctance of a magnetic path having a length of 2x 10^-3m and cross-sectional area of 2.5 x 10^-3 m^2?
**A. 6366 A.t/Wb**
B. 6000 A.t/Wb
C. 8x10^-3 A.t/Wb
D. 0.8 A.t/Wb

161. Calculate the permeability (in T/A. t/m) of a magnetic material that has a relative permeability of 300
**A. 3.78 x 10^-4**
B. 3.78 x 10^-5
C. 3.78 x 10^-3
D. 3.78 x 10^-6

162. Calculate the flux density that will be produced by the field intensity of 2000 a. t/m for a permeability of 126 x 10^-6 T/A.t/m
A. 0.252 G
B. 0.252 x 10^-2 T
**C. 0.252 T**
D. 0.252 x 10^-2 G

163. How many turns are needed to produce a magnetomotive force of 1000 A.t for a coil with 6 amperes?
A. 6000 turns
B. 600 turns
**C. 167 turns**
D. 67 turns

164. A 6- V battery is connected across a solenoid of 100 turns having a resistance of 2 **Ω**, Calculate the number of ampere turns?

A. 100

B. 50

C. **300**

D. 600

165. What determines the atomic number of an element?

A. **The number of protons**

B. The number of electrons

C. The number of neutrons

D. The number of neutrons and protons

166. One of the solid structures in which the position of the atoms or ions are predetermined

A**. Crystalline solid**

B. Amorphous solid

C. Polycrystalline solid

D. Poly- amorphous solid

167. Mmf in a magnetic circuit corresponds to _____ in an electric circuit

A. **Emf**

B. Voltage drop

C. Electric Field Intensity

D. Potential gradient

168. What solid has no defined crystal structure except perhaps in the arrangement of the nearest neighboring atoms or ions?

A. Crystalline

B. **Amorphous**

C. Polycrystalline

D. Poly- amorphous

169. Amorphous solid is also called

A. Crystalline

B. **Non- crystalline**

C. Polycrystalline

D. Homogenous

170. A principle that states that only two electrons with different spins are allowed to exist in a given orbit
A. Bohr's principle
**B. Pauli exclusion principle**
C. Avogadro's principle
D. Coulomb's principle

171. What bond is formed when one or more electrons in the outermost energy orbit of an atom are transferred to another?
**A. Ionic**
B. Covalent
C. Metallic
D. Van der Waals

172. In electro-mechanical conversion devices like generators and motors the reason why a small air gap is left between the rotor and stator is to
**A. permit mechanical clearance**
B. increase flux density in air gap
C. decrease the reluctance of magnetic path
D. complete the magnetic path

173. What bond is formed when electrons in the outermost energy orbits of the atoms are shared between two or more electrons?
A. Ionic
**B. Covalent**
C. Metallic
D. Van der Waals

174. Why is it that the magnitude of magnetomotive force required for air gap is much greater than that required for iron part of a magnetic circuit?
A. Because air is a gas
B. Because air has the highest relative permeability
C. Because air is a conductor of magnetic flux
**D. Because air has the lowest relative permeability**

175. What type of bond is formed when there exists some form of collective interactions between the (negatively charged) electrons and (positively charged) nuclei in a solid?
A. Ionic
B. Covalent
C. **Metallic**
D. Van der Waals

176. Permeance of a magnetic circuit is _____ the cross-sectional area of the circuit.
A. **directly proportional to**
B. inversely proportional to
C. dependent of
D. independent of

177. Formed when there exist distant electronic interactions between (opposite) charges present in the neighboring atoms or molecules.
A. Ionic bond
B. Covalent bond
C. Metallic bond
D. **Van der Waals bond**

178. Defined as the ratio of the volume occupied by the atoms or ions in a unit cell divided by the volume of the unit cell and is used to measure the compactness of a crystal.
A. **Atomic packing factor (APF)**
B. Ionic Packing Ratio (IPR)
C. Atomic compacting factor (ACF)
D. Ionic compacting ratio (ICR)

179. A factor used to correct for the electrostatic forces of the more distant ions in an ionic solid.
A. Avogadro's number
B. Planck's constant
C. Boltzmann's constant
D. **Madelung constant**

180. The conduction of electricity across the surface of a dielectric is called
A. **creepage**
B. skin effect
C. surface effect
D. crosstalk

181. A magnetic circuit carries a flux $\varphi_i$ in the iron part and a flux $\varphi_g$ in the air gap. What is the leakage coefficient?

**A. $\varphi_i / \varphi_g$**

B. $\varphi_i \times \varphi_g$

C. $\varphi_g / \varphi_i$

D. $\varphi_i + \varphi_g$

182. A law stating that the magnetic susceptibilities of most paramagnetic substances are inversely proportional to their absolute temperatures.

**A. Curie's Law**

B. Child's Law

C. CR Law

D. Curie-Weiss Law

183. The reluctance of the magnetic circuit is _____ relative permeability of the material comprising the circuit.

A. directly proportional to

**B. inversely proportional to**

C. independent of

D. dependent of

184. A law relating between the magnetic and electric susceptibilities and the absolute temperatures which is followed b ferromagnets, antiferromagnets, non-polar ferroelectrics, antiferroelectrics and some paramagnets.

A. Curie's Law

B. Child's Law

C. CR Law

**D. Curie-Weiss Law**

185. Theory of ferromagnetic phenomena which assumes each atom is a permanent magnet which can turn freely about its center under the influence of applied field and other magnets.

**A. Ewing's theory of ferromagnetism**

B. Oersted's ferromagnetism theory

C. Maxwell's magnetic theory

D. Ampere's circuital law

186. The reluctance of a magnetic circuit varies with
   A. length × area
   B. area ÷ length
   **C. length ÷ area**
   D. length + area

187. A theorem which states that an electric current flowing in a circuit produces a magnetic field at external points equivalent to that due to a magnetic shell whose bounding edge is the conductor and whose strength of the current.
   A. Joule's law
   B. Faraday's law
   C. Volta's theorem
   **D. Ampere's theorem**

188. What is the usual value of leakage coefficient for electrical machines?
   A. 0.5 to 1
   B. 1 to 5
   C. 5 to 10
   **D. 1.15 to 1.25**

189. The science of adapting electronics to aerospace flight.
   A. Avionics
   B. Aerotronics
   C. Aerodynamics
   **D. Astrionics**

190. The reluctance of a magnetic circuit is not dependent on which of the following?
   A. Number of turns of coil
   B. Magnetomotive force
   **C. Flux density in the circuit**
   D. Current in the coil

191. Another term for corona discharge.
   A. Lightning
   B. Sparking
   **C. Aurora**
   D. Corona Effect

192. The B-H curve for _____ is a straight line passing through the origin.
A. cobalt
**B. air**
C. hardened steel
D. soft iron

193. The phenomenon that when an electric current passes through an anisotropic crystal, there is an absorption or liberation of heat due to the non-uniformity in current distribution.
**A. Bridgman effect**
B. Corona effect
C. Dember effect
D. Destriau effect

194. The B-H curve of _____ is not a straight line.
A. air
B. wood
C. silicon steel
**D. soft iron**

195. If a magnetic flux cuts across 200 turns at a rate of 2Wb/s, the induced voltage according to Faraday's law is about
**A. 400 V**
B. 100 V
C. 200 V
D. 600 V

196. What is the SI unit of reluctance?
A. At
B. At/m
C. N/Wb
**D. At/Wb**

197. A magnetizing force of 1000 AT/m will produce a flux density of _____ in air.
**A. 1.257 mWb/m^2**
B. 0.63 Wb/m^2
C. 1.257 Wb/m^2
D. 0.63 mWb/m^2

198. Hysteresis loss can be reduced by one of the following.
   A. Increasing mmf of the circuit
   **B. Using material narrow hysteresis loop**
   C. Using ferromagnetic core
   D. Laminating the magnetic circuit

199. The core of a transformer heats up when its primary is fed from an ac source because of
   A. permeability
   B. ferromagnetism
   C. reluctance of core
   **D. hysteresis loss**

200. Which of the following materials has the least hysteresis loop area?
   A. soft iron
   **B. silicon steel**
   C. hard steel
   D. wrought iron

201. Core materials of a good relay have _____ hysteresis loop.
   A. large
   **B. narrow**
   C. very large
   D. very narrow

202. The magnetic materials should have a large hysteresis loss for one of the following applications.
   A. Transformers
   B. AC motors
   **C. Permanent Magnets**
   D. DC generators

203. If the magnetic material is located within a coil through which alternating current (60 Hz frequency) flows, then _____ hysteresis loops will be formed every second.
   **A. 60**
   B. 120
   C. 30
   D. 180

204. There are how many compounds available in nature?
A. 105
B. 1000
C. 300,000
**D. Unlimited**

205. Hysteresis is a phenomenon of _____ in a magnetic circuit.
A. setting up constant flux
B. lagging of H behind B
**C. lagging B behind H**
D. leading B ahead H

206. What is the measure of the density and sign of the electric charge at a point relative to that at some time?
**A. Electric potential**
B. Electric charge
C. Electric current
D. Electric intensity

207. _____ is a substance of whose molecules consist of the same kind of atom.
A. Mixture
B. Compound
**C. Element**
D. Isotope

208. Hipernik is an alloy containing _____ iron and _____ nickel.
**A. 40% ; 60%**
B. 60% ; 40%
C. 50% ; 50%
D. 70% ; 30%

209. The mass of proton is _____ the mass of an electron.
A. equal to
**B. about 1837 times**
C. less than
D. 200 times

210. What is the maximum number of electrons that can be accommodated in the last orbit of an atom?
A. 4
B. 2
C. **8**
D. 18

211. The electrons in the last orbit of an atom are called _____ electrons.
A. free
B. **valence**
C. bound
D. thermionic

212. If the number of valence electrons of an atom is less than 4, the substance is called
A. **a conductor**
B. a semiconductor
C. an insulator
D. a superconductor

213. If the number of valence electrons of an atom is more than 4, the substance is called
A. a semiconductor
B. a conductor
C. **an insulator**
D. a semi-insulator

214. If the number of valence electrons of an atom is exactly 4, then the substance is called
A. **a semiconductor**
B. a conductor
C. an insulator
D. a cryogenic conductor

215. If the number of valence electrons of an atom is less than 4, then the substance is probably
A. **a metal**
B. an insulator
C. a non-metal
D. a semiconductor

216. One coulomb of charge consists of _____ electrons.
A. **624 × 10^16**
B. 62.4 × 10^16
C. 6.24 × 10^16
D. 0.624 × 10^16

217. A one cubic cm of copper has how many free electrons at room temperature?
A. 80 × 10^18
B. **8.5 × 10^22**
C. 20 × 10^10
D. 50 × 10^20

218. Electronic current in a wire is the flow of _____ electrons.
A. **free**
B. valence
C. bound
D. loose

219. Electromotive force in a circuit
A. **causes free electrons to flow**
B. increases the circuit resistance
C. maintains circuit resistance
D. is needed to make the circuit complete

220. The resistance of a material is _____ its area of cross-section.
A. directly proportional
B. independent of
C. **inversely proportional to**
D. equal to

221. If the length and area of cross-section of a wire are doubled, then its resistance
A. becomes four times
B. becomes sixteen times
C. **remains the same**
D. becomes two times

222. A length of wire has a resistance of 10 ohms. What is the resistance of a wire of the same material three times as long and twice the cross-sectional area?
A. 30 ohms
B. 20 ohms
**C. 15 ohms**
D. 7 ohms

223. What is the SI unit of specific resistance or resistivity?
A. Ohm-circular mil per inch
B. Ohm-circular mil per foot
**C. Ohm-m**
D. Ohm-cm

224. The resistivity of a conductor _____ with an increase in temperature.
**A. increases**
B. decreases
C. remains the same
D. becomes zero

225. What is the SI unit of conductance?
**A. Siemens**
B. Mhos
C. Ohms
D. 1/Ohms

226. If the resistance of a material 2 m long and 2 m^2 in area of cross-section is 1.6 ×10^-8 Ω, then its resistivity is
A. 3.2 × 10^-8 Ω-m
**B. 1.6 × 10^-8 Ω-m**
C. 0.64 × 10^-8 Ω-m
D. 0.16 × 10^-8 Ω-m

227. What is the SI unit of conductivity?
A. Ohms/m
B. Ohms-m
C. Siemens-m
**D. Siemens/m**

228. The temperature coefficient of resistance of conductors is

A. **positive**
B. zero
C. negative
D. infinite

229. The temperature coefficient of resistance of semiconductors is

A. positive
B. zero
C. **negative**
D. infinite

230. What determines the value of the temperature coefficient of resistance of a material?

A. length
B. cross-sectional area
C. volume
D. **nature and temperature**

231. The temperature coefficient of resistance of a conductor _____ with an increase in temperature.

A. increases
B. **decreases**
C. remains the same
D. becomes negative

232. The temperature coefficient of resistance of insulators is

A. zero
B. **negative**
C. positive
D. infinite

233. The temperature coefficient of resistance of eureka is

A. positive
B. negative
C. **almost zero**
D. infinite

234. If the value of $\alpha_0$ a conductor is 1/234 per $^oC$, then the value of $\alpha_{18}$ is
A. 1/218 per $^oC$
**B. 1/252 per $^oC$**
C. 1/272 per $^oC$
D. 1/273 per $^oC$

235. If the value of $\alpha_{25}$ a conductor is 1/255 per $^oC$, then the value of $\alpha_{20}$ is
A. 1/300 per $^oC$
**B. 1/250 per $^oC$**
C. 1/230 per $^oC$
D. 1/260 per $^oC$

236. If the value of $\alpha_{25}$ of a conductor is 1/230 per $^oC$, then the value of $\alpha_0$ is
**A. 1/180 per $^oC$**
B. 1/150 per $^oC$
C. 1/280 per $^oC$
D. 1/230 per $^oC$

237. Ohm's law cannot be applied to which material?
A. Copper
B. Silver
**C. Silicon carbide**
D. Aluminum

238. What is the practical unit of electrical energy?
A. Watt
**B. Kilowatt-hour**
C. Kilowatt-second
D. Megawat-hour

239. A 200-watt lamp working for 24 hours will consume approximately _____ units.
A. 50
**B. 5**
C. 24
D. 0.5

240. The hot resistance of an incandescent lamp is about _____ its cold resistance.
A. **10 times**
B. 100 times
C. 5 times
D. 50 times

241. Under ordinary conditions, a body is considered
A. positively charged
B. **neutral**
C. negatively charged
D. stable

242. A positively charged body has
A. **deficit of electrons**
B. excess of neutrons
C. excess of electrons
D. deficit of protons

243. A negatively charge body has
A. deficit of electrons
B. excess of protons
C. **excess of electrons**
D. deficit of neutrons

244. This paper does not exhibit electricity because it contains the same number of
A. **protons and electrons**
B. neutrons and electrons
C. neutrons and positrons
D. atoms

245. What is the value of the absolute permittivity of air?
A. 8.854 μF/m
B. 8.854 × 10^-12 mF/m
C. **8.854 × 10^-12 F/m**
D. 8.854 × 10^-12 μF/m

246. What is the relative permittivity of air?
A. 0
**B. 1**
C. 8.854 × 10^-12
D. 4π × 10^-7

247. If two similar charges 1 coulomb each are placed 1 m apart in air, then the force of repulsion is
A.8 × 10^6 N
**B. 9 × 10 ^9 N**
C. 10^6 N
D. 5 × 10^6 N

248. If the relative permittivity of a material is 10, then its permittivity is
A. 4π × 10^-7 F/m
B. 4π × 10^-6 F/m
**C. 8.854 × 10^-11 F/m**
D. 8.854 × 10^-12 F/m

249. The force between two charges placed a given distance apart _____ as the relative permittivity of the medium is increased.
A. increases
**B. decreases**
C. remains unchanged
D. becomes infinite

250. What is another name for relative permittivity?
A. Dielectric strength
B. Electric intensity
C. Potential gradient
**D. Dielectric constant**

251. The relation between absolute permittivity of air ($\varepsilon_0$), absolute permeability of air ($\mu_0$) and velocity of light (c) is given by
A. $\mu_0\varepsilon_0$ = c^2
B. $\mu_0\varepsilon_0$ = c
C. $1/\mu_0\varepsilon_0$ = c
**D. $1/\mu_0\varepsilon_0$ = c^2**

252. The dielectric constant of most materials lies between

**A. 1 and 10**

B. 10 and 20

C. 20 and 50

D. 50 and 100

253. A test charge means a charge of

A. -1 C

B. 1 electron

**C. +1 C**

D. -20 C

254. Electric lines of force leave or enter the charge surface at an angle of

A. $30^{o}$

B. $45^{o}$

**C. $90^{o}$**

D. depending upon the angle of launch and entry

255. Electric field intensity is measured in

**A. volts/meter**

B. Newton/meter

C. Newton-meter

D. Amperes/meter

256. Electric field intensity is a _____.

A. scalar

B. phasor

**C. vector**

D. variable

257. Electric field intensity at a point due to a given charge _____ if the relative permittivity of the medium decreases.

A. decreases

B. remains unchanged

**C. increases**

D. becomes zero

258. The electric field intensity between the parallel plate air capacitor is 20 N/C. If an insulating slab of relative permittivity 5 is placed between the plates, then electric field intensity will be
A. 20 N/C
B. 100 N/C
**C. 4 N/C**
D. 40 N/C

259. The electric flux density is a _____ quantity.
A. phasor
**B. vector**
C. scalar
D. variable

260. The permittivity of a material is given by one of the following formulas.
A. DE
B. E/D
C. D^2/E
**D. D/E**

261. Electric field intensity at a point is numerically equal to _____ at that point.
A. potential gradient
B. potential difference
C. dielectric constant
**D. the force**

262. Three charges of +5 C, -6 C and +9 C are placed inside a sphere. What is the total flux passing through the surface of sphere?
**A. 8 C**
B. 14 C
C. 20 C
D. -6 C

263. The potential at a point due to a charge is 15 V. If the distance is increased three times, the potential at the point will be
**A. 5 V**
B. 18 V
C. 45 V
D. 15 V

264. Electric potential is a _____ quantity.
A. **scalar**
B. phasor
C. vector
D. variable

265. The electric potential at a point in air due to a charge is 21 V. If the air is replaced by a medium of relative permittivity of 3, then electric potential at that point will be
A. 63 V
B. 21 V
C. **7 V**
D. 42 V

266. The electric potential across part AB of a circuit is 5 V; point A being at higher potential. If a charge of 5 C moves from A to B, then energy released as
A. 5 joules
B. **25 joules**
C. 10 joules
D. 100 joules

267. What is the other name for dielectric strength?
A. **Breakdown voltage**
B. Electric intensity
C. Potential gradient
D. Dielectric constant

268. Which of the following materials has the highest dielectric strength?
A. **Glass**
B. Oiled paper
C. Mica
D. Air

269. What is used as the insulating material or dielectric in an electric ion?
A. Oiled paper
B. **Mica**
C. Paraffin
D. Titanate compound

270. What is used as the dielectric material in high voltage transformers?
   A. Mica
   B. Paraffin
   C. **Porcelain**
   D. Oiled paper

271. One farad equals
   A. **1 coulomb/volt**
   B. 1 newton/coulomb
   C. 1 newton-meter
   D. 1 volt/second/ampere

272. Which of the following is used by permanent magnets as the magnetic material?
   A. iron
   B. nickel
   C. soft steel
   D. **hardened steel**

273. Which of the following is used by temporary magnets as the magnetic material?
   A. Hardened steel
   B. Cobalt steel
   C. **Soft iron**
   D. Tungsten steel

274. What is the main advantage of temporary magnets?
   A. **The magnetic flux can be changed.**
   B. Hysteresis can be decreased.
   C. Magnetic materials can be used.
   D. Abundance of ferromagnetic material that can be temporarily magnetized.

275. Permanent magnets can be found in
   A. electric bells
   B. **earphones**
   C. relays
   D. dynamic loudspeakers

276. Temporary magnets are commonly employed in
   A. electric instruments
   **B. motors**
   C. moving coils loudspeakers
   D. magnetos

277. The force between two magnetic poles is _____ their pole strengths.
   **A. directly proportional to**
   B. the sum of
   C. inversely proportional to
   D. the product of

278. If the distance between two magnetic poles decreases by 2 times, the force between them
   A. decreases two times
   **B. increases four times**
   C. increases two times
   D. decreases four times

279. The force between two magnetic poles is _____ the relative permeability of the medium.
   A. directly proportional to
   B. independent of
   **C. inversely proportional to**
   D. equal to

280. Two similar poles, each 1Wb, placed 1 m apart in air will experience a repulsive force of
   **A. 63000 N**
   B. 63 × 10^-3 N
   C. 8 × 10^12 N
   D. 796 kN

281. One weber of flux is equal to _____ magnetic lines of force.
   A. 10^6
   B. 10^10
   C. 4π × 10^7
   **D. 10^8**

282. The unit of flux density is
   A. Wb/m
   **B. Tesla**
   C. At/m
   D. N/Wb

283. What is the typical saturation flux density for most magnetic materials?
   A. 4 Wb/m^2
   B. 5 Wb/m^2
   C. 1 Wb/m^2
   **D. 2 Wb/m^2**

284. Magnetic field intensity is a _____ quantity.
   A. scalar
   B. phasor
   **C. vector**
   D. variable

285. The force acting on a pole of 5 Wb is 25 N. What is the intensity of the magnetic field?
   **A. 5 N/Wb**
   B. 25 N/Wb
   C. 125 N/Wb
   D. 0.2 N/Wb

286. The relative permeability of a magnetic material is 10^5. What is its permeability?

   A. 4π × 10^5 H/m
   B. 4π × 10^-12 H/m
   **C. 4π × 10^-2 H/m**
   D. 4π × 10^-7 H/m

287. Which of the following has the highest permeability?
   A. Soft iron
   B. Steel
   C. Air
   **D. Permalloy**

288. A magnetic pole produces 5000 field lines. How much is the flux in webers?
A. **50 × 10^-6**
B. 5 × 10^-6
C. 500 × 10^-6
D. 500 × 10^-5

289. As the magnetic intensity decreases, the relative permeability of a magnetic material
A. decreases
B. remains the same
C. **increases**
D. becomes zero

290. The permeability of a material having a flux density of 5 Wb/m^2 is 10^-5 H/m. What is the value of magnetizing force?
A. 5 × 10^-5 N/Wb
B. **500 × 10^3 N/Wb**
C. 4π × 10^-7 N/Wb
D. 4π × 10^7 N/Wb

291. When the relative permeability of a material is slightly less than 1, it is called _____ material.
A. **diamagnetic**
B. ferromagnetic
C. paramagnetic
D. non-magnetic

292. When the relative permeability of a material is slightly more than 1, it is called _____ material.
A. diamagnetic
B. ferromagnetic
C. **paramagnetic**
D. non-magnetic

293. Which of the following is a diamagnetic material?
A. Aluminum
B. Silver
C. **Air**
D. Cobalt

294. Which of the following is a paramagnetic material?
   A. Carbon
   B. Bismuth
   C. Copper
   **D. Oxygen**

295. The greater percentage of materials is _____.
   A. diamagnetic
   **B. paramagnetic**
   C. ferromagnetic
   D. non-magnetic

296. When the relative permeability of a material is much greater than 1, it is called _____ material.
   A. diamagnetic
   **B. ferromagnetic**
   C. paramagnetic
   D. non-magnetic

297. The flux density in an air-cored coil is 10^-3 Wb/m^2. With a cast iron core of relative permeability 100 inserted, the flux density will become
   A. 10^-3 Wb/m^2
   B. 10^-2 Wb/m^2
   C. 10^3 Wb/m^2
   **D. 0.1 Wb/m^2**

298. At/m is a unit of
   A. mmf
   **B. magnetic force**
   C. reluctance
   D. magnetic flux density

299. The direction of force o a current carrying conductor placed in a magnetic field can be found by
   A. Cork screw rule
   **B. Fleming's left hand rule**
   C. Fleming's right hand rule
   D. using a compass

300. When a current carrying conductor is placed in a magnetic field, the maximum force will act on the conductor when the conductor is at an angle of _____ to the magnetic field.

A. $45^o$
B. $60^o$
C. $30^o$
D. **$90^o$**