

UNIT I
ELECTROMAGNETISM

1. The complete path followed by the magnetic flux is called

- a. electric circuit
- b. magnetic circuit
- c. electromagnetism
- d. electric field

ans: b

2. Current carrying conductor is always surrounded by

- a. magnetic field
- b. electric field
- c. Electricity
- d. current

ans: a

3. The direction of magnetic field produced by current carrying conductor is given by

- a. Lenz's law
- b. right hand thumb rule
- c. Fleming's left hand rule
- d. Kirchoff's law

ans: b

4. Imaginary lines of force originating from magnet is called

- a. current
- b. resistance
- c. flux
- d. magnetic field

ans: c

5. Region surrounded by magnet is called

- a. magnetic field strength
- b. magnetic field
- c. electric field
- d. resistance

ans: b

6. Lines of force is also called

- a. flux
- b. current
- c. resistance
- d. flux density

ans:a

7. Lines of force passing per unit area is called

- a. magnetic field
- b. magnetic flux
- c. magnetic flux density
- d. magnetic field strength

ans:c

8. unit of flux is

- a. weber
- b. wb/m²
- c. Tesla
- d. AT

ans:a

9. Unit of flux density is

- a. wb/m²
- b. wb
- c. AT/wb
- d. A

ans:a

10. Unit of magnetic field

- a. wb/m²
- b. wb
- c. AT/wb
- d. none of above

ans:b

11. Unit of reluctance is

- a. AT/wb
- b. AT

c. Tesla
d. Wb/A
ans:a

12. Opposition to the magnetic lines of force is called
a. Flux
b. resistance
c. susceptance
d. reluctance
ans:d

13. Unit of magnetic field strength is
a. AT/m
b. AT/wb
c. Tesla
d. ohms
ans: a

14. The force on two current carrying conductors in the same direction
a. have force of repulsion between them
b. have force of attraction between them
c. remains unaffected
d. none of above
ans: b

15. Magneto motive force is directly proportional to
a. no. of turns of coil
b. current through the coil
c. both a and b
d. none of above
ans: c

16. The term permeability for a material means
a. the no. of turns on an air core
b. the mmf required to produce one unit of magnetic flux
c. the ability of a material to conduct electricity through it

d. the ability of material to conduct magnetic lines of force
ans: d

17. An air gap is usually inserted in a magnetic circuit
a. to prevent saturation
b. increase flux
c. decrease flux
d. increase mmf
ans: a

18. A magnetic circuit requires 800 ampere turns to produce a certain amount of flux. If exciting coil of 100 turns has 5 ohms resistance, then the voltage to be applied to the exciting coil must be
a. 40V
b. 20 V
c. 10V
d. 5V
ans: a

19. Permeability of a material is the ratio of
a. magnetic field to flux density
b. flux density to magnetic field strength
c. magnetic field strength to flux density
d. none of above
ans: b

20. The term saturation related to magnetic circuit means
a. magnetic field strength increases with current
b. flux density increases with current
c. flux density remains constant if magnetic field strength is increased
d. magnetic field strength remains constant if flux density is increased.
ans:c

21. The lines of force produced by coil completing their path through air, instead of intended path is called

- a. useful flux
- b. saturated flux
- c. air flux
- d. leakage flux

ans: d

22. The bulging of lines of force in air gap in a magnetic circuit is called

- a. leaking flux
- b. merging
- c. fringing
- d. scattering

ans: c

23. Relative permeability of vacuum is

- a. $4\pi \times 10^{-7}$ H/m
- b. 1 H/m
- c. 1
- d. $\frac{1}{4}$ H/m

ans: c

24. MMF in magnetic circuit is analogous to

- a. electric current in electric circuit
- b. current density in conductor
- c. electromotive force
- d. resistance in electric circuit

ans: c

25. Reluctance is analogous to

- a. emf in electric circuit
- b. resistivity
- c. conductivity
- d. resistance in electric circuit

ans: d

26. The magnetic reluctance of a material

- a. increases with increasing cross sectional area of material

b. does not vary with increasing the cross sectional area

c. decreases with increasing cross sectional area of material

d. decreases with increasing the length of material

ans: c

27. The correct relation stated as following is

a. $\phi = \frac{NI}{l/\mu_0\mu_r}$

b. $NI = B \times l/a \mu_0\mu_r$

c. $N=H \times l$

d. $NI = \phi \times l/\mu_0\mu_r a$

ans: d

28. The permeance in a magnetic circuit corresponds to

a. resistance in an electric circuit

b. emf in an electric circuit

c. conductivity in electric circuit

d. conductance in an electric circuit

ans: d

29. The ampere turns are

a. the product of the number of turns and current of the coil

b. the number of turns of a coil through which current is flowing

c. the currents of all turns of the coil

d. the turns of transformer winding

ans: a

30. What will be the current flowing through the ring shaped air core when number of turns is 800 and ampere turns are 3200

a. 0.25

b. 2.5

c. 4.0

d. 0.4

ans: c

31. Leakage factor is defined as the ratio of

- a. flux in air gap by total flux
- b. Total flux by useful flux
- c. airgap flux by useful flux
- d. total flux by flux produced by solenoid

ans: b

32. Effect of fringing in magnetic circuit is

- a. it increases flux density
- b. its effective area of air gap decreases
- c. it decreases flux density
- d. none of above

ans:c

33.The force experienced by unit north pole when placed at point in a magnetic field is called

- a. magnetic field strength at that point
- b. exerted force at that point
- c.flux
- d. magnetic field

ans:a

34. The mechanical force acting on current carrying on conductor when placed in magnetic field is given by relation

- a. $F= N d\phi/dt$
- b. $F= Blv \sin\Theta$
- c. $F= BIL \sin\Theta$
- d. $F=L di/dt$

ans: c

35. Which of the following has the highest magnetic permeability?

- a. paramagnetic substances
- b. diamagnetic substances
- c. ferromagnetic substances
- d. vacuum

ans: c

36. The perfect insulator for magnetic lines of force is

- a. copper
- b. rubber
- c. glass
- d. none of these

ans: d

37. The force between two parallel current carrying conductors is given by relation

- a. $I_1 I_2 \times 2 \times 10^{-7} \times l/d$
- b. $I_1 I_2 / l_2 \times 4\pi \times 10^{-7}$
- c. $I_1 I_2 / 2\pi \times 10^{-7}$
- d. $I_1^2 \times 4 \times 10^{-7} l d$

ans: a

39. The magnitude of force experienced by current carrying conductor placed in magnetic field depends on

- a. value of flux
- b. magnitude of current flowing through conductor
- c. direction of current
- d. all of above

ans: d

40.Two current carrying conductor lying parallel and close to each other. They are carrying current in the opposite direction. The force between them is

- a. repulsive
- b. Attractive
- c. Zero
- d. none of these

ans: a

41. Two current carrying conductor lying parallel and close to each other. They are carrying current in the same direction. The force between them is

- a. repulsive
- b. Attractive
- c. Zero
- d. none of these

ans: b

42. Two current carrying conductor lying parallel and close to each other are exerting force of attraction on each other. The currents are

- a. very high
- b. in opposite direction
- c. low
- d. in the same direction

ans: d

43. Two current carrying conductor lying parallel and close to each other are exerting force of repulsion on each other. The currents are

- a. very high
- b. in opposite direction
- c. low
- d. in the same direction

ans: b

44. Two conductors are carrying 1000A and 5000A currents respectively are 5cm apart. The force per meter length between two conductors is

- a. 100 N/m
- b. 40 N/m
- c. 30 N/m
- d. 20 N/m

ans: d

45. Magnetic field strength due to N long straight current carrying conductors in the same direction is given by

- a. $H = NI / 4\pi d$
- b. $H = I / 2\pi d$
- c. $H = NI / 2\pi d$
- d. $H = NI / l$

ans: c

46. A conductor of 10cm length carrying a current of 5A placed in uniform magnetic field

of flux density 1.25T at 30° to the lines of flux. Force acting on conductor will be

- a. 0.3125N
- b. 3.125N
- c. 1.325N
- d. 5.321N

ans: a

47. Fleming's left hand rule is used to find

- a. Magnitude of induced emf in conductor
- b. Direction of magnetic field in conductor
- c. Direction of force on current carrying conductor
- d. Magnitude of flux density

ans: c

48. Which statement is correct related to magnetic field produced due to current carrying conductor

- a. direction of rotation of screw to advance in the direction of current gives the direction of magnetic field
- b. If right hand curled fingers shows the direction of current, thumb gives the direction of magnetic field
- c. if direction of rotation of screw shows current, tip gives the direction of magnetic field
- d. all of these

ans: a

49. Force experienced by current carrying conductor when placed in magnetic field will be zero when

- a. current in the conductor is maximum
- b. Angle between conductor and field is zero
- c. Both a & b
- d. None of these

ans: b

50. Relative permeability is defined as the ratio of

- a. magnetic field strength in a medium to flux density in the same medium
- b. Magnetic flux density in vacuum to magnetic field strength in vacuum
- c. Magnetic flux density in other medium to flux density in vacuum
- d. Magnetic flux density in vacuum to flux density in other medium

ans: c

51. The ability with which the magnetic material allows the flux to pass through a given medium is called

- a. susceptibility
- b. permeability
- c. conductivity
- d. reluctance

ans: b

52. Unit of permeability is

- a. A/m
- b. H/m
- c. I/m
- d. m/H

ans: b

53. Permeability of free space or vacuum is defined as the ratio of

- a. magnetic flux density in vacuum to magnetic field strength
- b. Magnetic flux density in other medium to magnetic field strength
- c. Magnetic field strength to magnetic flux density in vacuum
- d. Magnetic field strength in medium to flux density in other medium

ans: a

54. Right hand thumb rule is used to find out

- a. direction of induced emf
- b. direction of magnetic field due to current carrying conductor

- c. magnitude of force experienced
- d. direction of force

ans: a

55. In left hand rule, thumb always represents

- a. current
- b. voltage
- c. magnetic field
- d. direction of force on conductor

ans: d

56. The force between two long current carrying conductor is inversely proportional to

- a. current in one conductor
- b. product of current in two conductors
- c. distance between the two conductors.
- d. radius of conductors

ans: c

57. While comparing magnetic and electric circuit, the point of dissimilarity exists while considering

- a. mmf and emf
- b. Reluctance and resistance
- c. flux and current
- d. permeance and conductance

ans: c

59. Permeance is to reluctance as conductance is to

- a. inductance
- b. resistance
- c. capacitance
- d. ampere turns

ans: b

60. A straight cylindrical solenoid has a flux of 12mwb and a flux density of 0.9T. The diameter of solenoid must be

- a. 130cm
- b. 13cm
- c. 10cm

d.5cm

ans : b

61. 1 tesla is given as

- a. $1\text{wb}/\text{m}^2$
- b. $1\text{wb}/\text{cm}^2$
- c. $1\text{mwb}/\text{cm}^2$
- d. $1\text{wb}/\text{mm}^2$

ans: a

62. Which part of the magnetic path requires largest mmf

- a.coil
- b.core
- c.airgap
- d. inductance

ans: c

63. Soft steel and iron alloy allow easy passage of a magnetic flux because

- a. of its high elasticity
- b. of its high permeability
- c. of its high conductivity
- d. of its high reluctance

ans: b

64. Magnitude of the magnetic field produced by a coil is proportional to

- a. Permeability of the core material
- b. the no. of turns of coil
- c. the magnitude of current flow through the coil
- d. the product of all above

ans:d

Following data should be used for solving 65 to 67

A coil is wound uniformly with 300 turns over steel ring of relative permeability 900, having mean circumference of 40mm and cross sectional area of 50mm^2 . A current of 25A is passed through coil

65. the mmf of ring is _____

- a.5000AT
- b. 7200AT
- c.750AT
- d. 7500AT

ans:d

66. The reluctance of ring is _____

- a. 7×10^7 AT/Wb
- b. 0.7×10^6 AT/Wb
- c. 6×10^7 AT/Wb
- d. 6×10^5 AT/Wb

ans: b

67.The value of flux is _____

- a.10.7 Wb
- b.70 mWb
- c.10.7mWb
- d. 107 mwb

ans: c

68. The relative permeability of air is _____

- a. 1
- b. less than 1
- c. greater than 1
- d. 1000

ans: a

69. Relative permeability of all non magnetic materials is _____

- a. 300
- b. 0.7
- c.1
- d. 0

ans: c

70. Which of the following is non magnetic material?

- a. iron
- b. Mild steel
- c. brass

d. Silicon steel

ans: c

71. Which of the following is magnetic material?

- a. copper
- b. silicon steel
- c. aluminium
- d. brass

ans: b

72. Flux in the air gap is called

- a. leakage flux
- b. total flux
- c. useful flux
- d. all of above

ans: c

73. A magnetic circuit has a mmf of 400AT and a reluctance of 2×10^5 AT/wb. The magnetic flux in the magnetic circuit is

- a. 3×10^{-5} Wb
- b. 2×10^{-3} Wb
- c. 1.5×10^{-2} Wb
- d. 2.5×10^{-4} Wb

ans: b

74. A 2cm long coil has 10 turns and carries a current of 750mA. The magnetizing force of the coil is

- a. 225 AT/m
- b. 675 AT/m
- c. 450 AT/m
- d. 375 AT/m

ans: d

75. The reluctance of a magnetic circuit varies with

- a. length \times area
- b. length / area
- c. area/length
- d. $(\text{length})^2 + \text{area}$

ans: b

76. A strength of an electromagnet is determined by

- a. reluctance
- b. permeability of the core
- c. mmf
- d. all of above

ans: d

77. The strength of the magnetic field around a conductor is directly proportional to

- a. voltage across the conductor
- b. current in the conductor
- c. type of material of conductor
- d. none of above

ans: b

78. Reluctance of magnetic material is

- a. less than non magnetic material
- b. more than non magnetic material
- c. equal to that of non magnetic material
- d. none of above

ans: a

79. The denser the flux

- a. stronger is the magnetic field
- b. weaker is the magnetic flux
- c. no effect on the strength of field
- d. none of above

ans: a

80. The direction of induced e.m.f. is given by

- a. Flemings right hand rule
- b. Flemings left hand rule
- c. faradays law of electromagnetic induction
- d. crotch screw rule.

ans: a

81. Magnitude of induced e.m.f. in a generator depend on

- a. flux density
- b. magnitude of current

c. rate of cutting flux

d. Rate of current discharge.

ans:c

82. According to Lenz's law direction of induced e.m.f. is.

a. Same as cause produced

b. Perpendicular to cause produced

c. opposite to cause produced

d. Non above

ans:c

83. According to Faraday's Laws of electromagnetic induction, an e.m.f. is induced in a conductor whenever it

a. Lies in magnetic field

b. Cuts magnetic flux

c. moves parallel to the direction of the magnetic field

d. lies perpendicular to the magnetic flux.

ans:b

84. When a magnet moves past an object, it will produce eddy currents in the object if the object is

a. a solid

b. an insulator

c. a conductor

d. made from the magnetic material

ans:d

85. Electricity can be generated by rotating a wire loop between the poles of a magnet. In which of the following positions would induce the greatest current in the loop?

a. The plane of the loop is parallel to the magnetic field.

b. The plane of the loop is perpendicular to the magnetic field.

c. The plane of the loop makes an angle of 45° with the magnetic field.

d. The induced current is the same in all positions

ans:b

86. In which of the following situations a voltage is induced in a conductor?

a. The conductor moves through the air.

b. The conductor is connected to a battery.

c. The conductor is connected to a motor.

d. The conductor is moved in a magnetic field.

ans:d

89. In case of dynamically induced emf, direction of induced emf is given by

a. Fleming's right hand rule

b. Lenz's law

c. Faraday's first law

d. Faraday's second law

ans:a

90. Emf induced in a coil due to its own current is called _____ Induction.

a. Mutual

b. Self

c. Dynamic

d. Static

ans:b

91. Emf induced in a coil due to current change in neighboring coil is called _____ induction.

a. Mutual

b. Self

c. Dynamic

d. Static

ans:a

92. Co-efficient of self induction is also called as _____

a. self- induction

b. Inductance

c. Self- inductance

d. Induction

ans:a

93. The property of a coil due to which it opposes the change of current flowing through itself is called_____ of the coil.

- a. Static inductance
- b. Dynamic inductance
- c. Self inductance
- d. Mutual inductance

ans:c

94. _____ is used to sense the flow of current in a electric circuit.

- a. Ammeter
- b. Voltmeter
- c. Wattmeter
- d. Galvanometer

ans:a

95. The phenomenon of the self induction is felt only when the current in the coil is

- a. Changing
- b. Increasing
- c. Decreasing
- d. All the above

ans:a

96. The negative sign in the induced emf of self induction indicates that energy is being absorbed from the electric circuit and stored as _____ energy in the coil.

- a. mechanical
- b. Electronic
- c. electric
- d. Magnetic

ans:d

97. Unit of co-efficient of self induction of the circuit is _____

- a. Volt
- b. Ampere

c. Henry

d. Linkages

ans:c

98. Unit of induced emf is _____

- a. Volt
- b. Ampere
- c. Henry
- d. Linkages

ans:a

99. The property of one coil due to which it opposes the change in the other coil is called..... between two coils.

- a. Dynamic inductance
- b. Static inductance
- c. Self inductance
- d. Mutual inductance

ans:d

100. The unit of mutual inductance is _____

- a. Volt
- b. Ampere/ Volt
- c. Henry
- d. Linkages

ans:c

101. In the expression $e = \frac{M di_1}{dt}$, M represents

- a. Mutual induction
- b. Mutual inductance
- c. Number of lines of force
- d. None of these

ans:b

102. If 0.75 V is induced emf and resistance offered by the coil is 200 ohm then induced current is

- a. 3.75 A
- b. 3.75 mA
- c. 3.75 μ A

d. 37.5 mA

ans:b

103. If magnetic flux changes from 0.8 Wb to 0.3 Wb, then change in flux is _____ Wb.

a. 1.1

b. 0.5

c. -0.5

d. -1.1

ans:c

104. If Number of turns of coil is 200 and if the current is 100mA, then MMF is _____

a. 2000 AT

b. 200 AT

c. 20 AT

d. 0.5 AT

ans:c

105. Leakage factor is also called as

a. Fringing

b. Coefficient of inductance

c. Magnetic coefficient

d. Hopkinson's coefficient

ans:d

106. Movement of electrons are called as

a. MMF

b. Current

c. Voltage

d. Flux

ans:b

107. Flux density is equal to _____ of flux and area of cross – section.

a. Sum

b. Difference

c. Product

d. Fraction

ans:d

108. NI expression is called

a. MMF

b. EMF

c. Flux linkage

d. Magnetic intensity

ans:a

109. Expression NI/L is called

a. MMF

b. EMF

c. Flux linkage

d. Magnetic field strength

ans:d

110. Expression for mutual inductance is

a. $-L \, dI/dt$

b. $M \, dI / dt$

c. $N_2 \Phi_2 / I_1$

d. $N\Phi/I$

ans:c

111. Faraday's law of electromagnetic induction is $e =$

a. $-Nd\Phi/dt$

b. $M \, dI / dt$

c. $N_2 \Phi_2 / I_1$

d. $N\Phi/I$

ans:a

112. The constant K in case of mutual induction is equal to

a. Φ_1/Φ_2

b. Φ_2/Φ_1

c. Φ_1/I_1

d. Φ_2/I_1

ans:d

113. Product of the permeability $\mu_o\mu_r$ is equal to

a. Magnetic flux

b. Magnetic field

c. Magnetic intensity

d. Magnetic flux density / magnetic field strength

ans:d

114. Expression for self induced emf is

- a. $-L \, di/dt$
- b. $M \, di_1 / dt$
- c. $N_2 \Phi_2 / I_1$
- d. $N\Phi/I$

ans:d

115. _____ is normally termed as flux linkages.

- a. Φ
- b. $d\Phi/dt$
- c. $N\Phi$
- d. Φ/I

ans:c

116. The term $N\Phi/I$ is generally called as _____

- a. Self inductance
- b. Mutual inductance
- c. Flux linkage
- d. Induced emf

ans:a

117. In the expression for reluctance $S = l/\mu A$ of a conductor, letter A represents _____ of the conductor.

- a. Total area
- b. Surface area
- c. Cross-sectional area
- d. None of these.

ans:c

118. When a current carrying conductor is brought in to magnetic field, the force that moves the conductor depends on

- a. direction of current.
- b. length of conductor
- c. value of current
- d. all of the above

ans:d

119. Two current carrying conductors lying parallel to each other are exerting a force of attraction on each other. The currents are

- a. Very high
- b. in opposite direction
- c. low
- d. in the same direction

ans:d

120. Two conductors are lying parallel and close to each other. They are carrying currents in opposite directions. The force between them is.

- a. Repulsive
- b. attractive
- c. zero
- d. none of these

ans:a

121. When a coil consisting of single turn rotates at uniform speed in magnetic field, the induced emf is _____

- a. steady
- b. alternating
- c. changing
- d. reversing

ans:b

122. The emf induced in a conductor of length 1 meter moving at a right angles to a uniform magnetic field of flux density 1.5 wb/m^2 with velocity of 50 m/s is.

- a. 0
- b. 1.5 v
- c. 75 v
- d. 100 v

ans:c

123. Which of following statements is incorrect.

- a. Whenever flux linking with the coil or circuit changes, an emf is induced.
- b. The direction of dynamically induced emf can be determined by Fleming's right-hand rule.

- c. the coefficient of self-inductance is proportional to the square of number of turns on it.
- d. Coefficient of coupling for tightly coupled coil is zero.
- ans: d