

Basic Electrical Theory

1. Voltage (V)
2. Current (I)
3. Resistance (R)
4. Ohm's Law
5. Power ($P = VI$)
6. Power ($P = I^2R$)
7. Efficiency
8. Phase Angle
9. Energy (kWh)
10. Impedance (Z)
11. Reactance (X)
12. Capacitance (C)
13. Inductance (L)
14. Power Factor
15. Frequency (Hz)
16. RMS (Root Mean Square)
17. IR drop
18. Active Power
19. Reactive Power
20. Apparent Power
21. Power Triangle

Magnetism and Electromagnetism

22. Magnetic Flux (Φ)
23. Magnetic Field Strength (H)
24. Magnetic Permeability (μ)
25. Reluctance
26. Electromagnetic Induction
27. Faraday's Law
28. Lenz's Law
29. Hysteresis
30. Eddy Currents
31. Magnetomotive Force (MMF)
32. B-H Curve
33. Magnetic Saturation

Transformers

34. Core Design (Shell, Core)
35. Primary / Secondary Windings
36. Turns Ratio
37. Step-Up / Step-Down Transformer
38. Auto-Transformer
39. Three-Phase Transformer
40. Open Delta Connection
41. Delta-Delta / Wye-Delta Configurations
42. Voltage Regulation
43. Efficiency
44. Equivalent Circuit
45. Inrush Current
46. Tap Changer

DC Machine Components and Concepts

47. Armature
48. Field Winding
49. Series Winding
50. Shunt Winding
51. Compound Winding
52. Commutator
53. Brushes
54. Back EMF (Counter EMF)
55. Yoke
56. Poles
57. Interpoles
58. Residual Magnetism
59. Armature Reaction
60. Lap Winding
61. Wave Winding
62. Speed Control Methods
63. Efficiency
64. Losses (Copper, Iron, Mechanical)

AC Machine Components and Concepts

- 65. Stator
- 66. Rotor
- 67. Slip Rings
- 68. Air Gap
- 69. Pole Pitch
- 70. Cage Rotor
- 71. Wound Rotor
- 72. Torque-Speed Curve
- 73. Rotor Resistance Control
- 74. Starting Methods (DOL, Star-Delta, Auto-Transformer)
- 75. V/f Control
- 76. Salient Pole
- 77. Non-Salient Pole
- 78. Distributed Winding
- 79. Concentrated Winding
- 80. Balanced 3-Phase Winding

Synchronous Generators (Alternators)

- 81. Rotor Excitation
- 82. Automatic Voltage Regulator (AVR)
- 83. Synchronous Reactance
- 84. Load Angle
- 85. Power Angle Curve
- 86. Synchronization
- 87. Parallel Operation
- 88. Droop Control
- 89. Governor System
- 90. Generator Protection (Overload, Overvoltage)

Protective Devices

- 91. Circuit Breaker (MCB, MCCB, ACB, VCB, SF6)
- 92. Fuse
- 93. Overload Relay
- 94. Ground Fault Protection
- 95. Ground Fault Circuit Interrupter (GFCI)
- 96. Surge Arrester

- 97. Isolation Switch
- 98. Grounding / Earthing
- 99. Protection Coordination

Measuring Instruments and Instrument Transformers

- 100. Voltmeter
- 101. Ammeter
- 102. Wattmeter
- 103. Energy Meter
- 104. Power Factor Meter
- 105. Multimeter
- 106. Clamp Meter
- 107. Oscilloscope
- 108. Synchroscope
- 109. Current Transformer (CT)
- 110. Potential Transformer (PT)

Control and Excitation Systems

- 111. Exciter
- 112. Brushless Exciter
- 113. Static Excitation
- 114. Field Discharge Resistor
- 115. Field Flashing
- 116. Automatic Voltage Regulator (AVR)
- 117. Field Weakening
- 118. VFD (Variable Frequency Drive)
- 119. Soft Starter
- 120. Controller
- 121. Motor Control Center (MCC)
- 122. Low Voltage Protection
- 123. Low Voltage Release
- 124. Contactor
- 125. Relay
- 126. Eutectic Alloy
- 127. Bimetallic Strip
- 128. Speed Droop
- 129. Voltage Regulation

DC Motors

- 130. Separately Excited DC Motor
- 131. Shunt DC Motor
- 132. Series DC Motor
- 133. Compound DC Motor
- 134. Cumulative Compound
- 135. Differential Compound
- 136. Permanent Magnet DC Motor (PMDC)

AC Induction Motors (Asynchronous)

- 137. Squirrel Cage Induction Motor
- 138. Wound Rotor Induction Motor
- 139. Single-Phase Induction Motor
- 140. Split Phase Motor
- 141. Capacitor Start Motor
- 142. Capacitor Start-Capacitor Run Motor
- 143. Shaded Pole Motor
- 144. Squirrel Cage Rotor
- 145. Synchronous Speed
- 146. Slip

AC Synchronous Motors

- 147. Synchronous Speed
- 148. Rotor Construction Types
- 149. Cylindrical Rotor (Non-Salient Pole)
- 150. Salient Pole Rotor
- 151. Amortisseur windings
- 152. Pull-in Torque
- 153. Pull-out Torque
- 154. Over-excited Operation
- 155. Under-excited Operation
- 156. Synchronous Condenser
- 157. Self-Excitation
- 158. Brushless Excitation

Special Motors

- 159. Universal Motor
- 160. Stepper Motor
- 161. Servo Motor
- 162. Brushless DC Motor (BLDC)