Transmission And Distribution Of Electrical Power

1. By which of the following method electric power may be transmitted from one location to another location?
    a) UnderGround System
    b) Overhead system
    c) **Both 1 and 2**
    d) None of the above
2. Which of the following transmission line have more initial cost?
    a) Overhead Transmission
    b) Underground transmission
    c) Both have almost the same initial cost
    d) None of the above
3. Transmission lines are classified as short, medium and long depending on the
    a) Length of line
    b) Charging current or on load current
    c) Capacitance of line
    d) Both (a) and (b) above
4. In power transmission line, grounding is generally done at
    a) Middle of the line
    b) The receiving end
    c) The supply end
    d) None of these
5. In stranded conductor of 6 layers, what will be the total number of individual wire?
    a) 75
    b) 85
    c) 84
    d) 74
6. A standard conductor have three layers of wire. What will be the diameter of stranded conductor if diameter of each strand is 5 mm?
    a) 38 mm
    b) 15 mm
    c) 20 mm
    d) 35 mm

7. What is the disadvantage of using Stranded Hard Drawn Copper for overhead transmission lines?
   a) Low tensile strength
   b) Due to electrolytic troubles
   c) Corrosion
   d) High cost

8. Which of the following conductors are most suitable for short lines supplying rural areas and operating at voltage of about 11 Kv?
   a) Hard Drawn Copper Conductor
   b) ACSR Conductor
   c) Galvanized steel
   d) Phosphor Bronze

9. Which of the following conductive material will be preferred when harmful gases such as ammonia are present in atmosphere?
   a) Cadmium copper
   b) Phosphor bronze
   c) Galvanized steel
   d) Aluminum

10. What is the amount of Corona losses in ACSR conductors in comparison to copper conductors?
    a) Low
    b) High
    c) Same
    d) No Corona loss

11. What is the advantage of cadmium copper over hard drawn copper?
    a) Higher conductivity
    b) Higher tensile strength
    c) Low cost

d) Low conductivity

12. In extra High Voltage lines, which conductor material is used for ground wire provided above the line conductors for protection against lightning?
    a) Hard drawn copper
    b) Cadmium copper
    c) Stranded galvanized steel
    d) ACSR

13. Which of the following conductor is needed to use with shortest span?
    a) ACSR Conductors
    b) All Aluminium Conductors
    c) Hard Drawn Copper Conductors
    d) Cadmium Copper Conductors

14. Which of the following wire is used as stay wire?
    a) All Aluminum Conductors
    b) Standard Galvanized Steel Conductors
    c) Cadmium Copper Conductors
    d) Phosphor Bronze Conductors

15. What happens to the tension in a conductor hanged between two poles, when temperature varies?
    a) Tension increases with increase in temperature
    b) Tension decreases with increase in temperature
    c) Tension first increases and decreases with decrease in temperature
    d) Tension in conductor is independent of temperature variation

16. What is the effect of rise in temperature on sag when Ice and wind effect are eliminated?
    a) Sag decreases
    b) Sag increases
    c) Sag remains constant

d) Sag becomes zero

17. What is the relation between length of span and sag?
    a) sag ∝ √span
    b) sag ∝ (1/span)
    c) sag ∝ $span^2$
    d) Sag ∝ $span^3$

18. What should be the value of sag for proper operation of overhead transmission line?
    a) High
    b) Low
    c) Nither too low nor too high
    d) Anything

19. An overhead transmission line has a span of 220 metres the conductor waiting 0.604 kg/m. What will be the maximum sag if the working tension is 2879 kg.
    a) 8.96 m
    b) 8.86 m
    c) 8.85 m
    d) 1.27 m

20. What is the value of working stress in overhead conductors?
    a) Less than ultimate stress
    b) More than ultimate stress
    c) Always equal to ultimate stress
    d) Should be zero

21. When the sag exceeds 10% of the span length, the shape made by the conductor is similar to which of the following shape?
    a) Hyperbola
    b) Parabola
    c) Catenary

d) Straight line

22. What will be the resultant weight on per meter of length of conductor if weight of conductor is 150 kg/m, weight of ice in per meter of length is 60 kg/m and wind force is 200 Kg/m.?
    a) 300 kg/m
    b) 468 kg/m
    c) 290 kg/m
    d) 390 Kg/m

23. What are aeoline vibrations in overhead transmission line conductors?
    a) High frequency and low amplitude vibrations
    b) High frequency and high amplitude vibrations
    c) Low frequency and low amplitude vibrations
    d) Low frequency and high amplitude vibrations

24. What are galloping vibrations in overhead transmission line conductors?
    a) High frequency and low amplitude vibrations
    b) High frequency and high amplitude vibrations
    c) Low frequency and low amplitude vibrations
    d) Low frequency and high amplitude vibrations

25. Which of the following vibrations causes different conductors to touch due to high swing?
    a) Aeoline vibrations
    b) Galloping vibrations
    c) Aeoline and Galloping
    d) Amplitude vibrations

26. Dancing’ of overhead conductors occurs during which of the following types of vibrations?
    a) Aeoline vibrations
    b) Galloping vibrations

c) Aeoline and Galloping

d) Amplitude vibrations

27. What are the method for prevention of low frequency high amplitude vibrations?

a) Horizontal conductor configuration

b) Vertical conductor configuration

c) Horizontal and Vertical conductor configuration

d) There is no method for prevention of such vibrations

28. What are the methods used to protect conductors against high frequency resonant vibrations?

a) Horizontal conductor configuration

b) Vertical conductor configuration

c) By using dampers

d) There is no method for prevention of such vibrations

29. The underground system cannot be operated over

a) 440V

b) 11 kV

c) 33 kV

d) **66kV**

30. The over head system can be operated over

a) 440V

b) 11 kV

c) 33 kV

d) 66kV

31. Which of the following material is not used for overhead line insulators?

a) Porcelain

b) Glass

c) PVC

d) Steatite

32. Pin type insulators are mostly subjected to which type of mechanical stress?
    a) Compressive stress
    b) Tensile stress
    c) Both tensile and compressive stress
    d) Twisting stress

33. Which of the following is the main field of application of pin type insulator?
    a) Distribution system
    b) Transmission system
    c) Transmission and distribution system
    d) EHV transmission system

34. Suspension type insulator are subjected to _____
    a) tensile stress
    b) compressive stress
    c) tensile and compressive stress
    d) depends on its use

35. A transmission line consists of 9 discs of suspension insulator in each string. What is the operating voltage of the transmission line?
    a) 11 KV
    b) 33 KV
    c) 66 KV
    d) 132 KV

36. Suspension insulator are made up of _____
    a) glass
    b) porcelain
    c) steatite
    d) epoxy resin

37. Which of the following insulator is similar to pin type insulator?
    a) Suspension insulator
    b) Post insulator
    c) Strain insulator
    d) Shackle insulator

38. Which type of insulator is used where there is dead end of the line or there is a corner or a sharp curve, for high voltage line?
    a) Pin type insulator
    b) Shackle insulator
    c) Strain insulator
    d) Stay insulator

39. What is the most common cause of failure of overhead line insulators?
    a) Flashover
    b) Mechanical stress
    c) Porosity of materials
    d) Improper vitrification

40. If a string of suspension insulator has three units, each can withstand a maximum 11 KV and total string can withstand 25.76 KV. What is the string efficiency?
    a) 234.1%
    b) 46.3%
    c) 68.75%
    d) 78%

41. Voltage distribution across disc of strings of suspension insulator assembly is _____
    a) same for all disks
    b) maximum for unit nearest to the line
    c) maximum for unit nearest to the tower
    d) equal to transmission line voltage rating

42. The unequal voltage distribution across individual unit of string of suspension

insulator is _____

a) desirable and expressed by string efficiency

b) undesirable and expressed by string efficiency

c) desirable and expressed by impulse ratio

d) undesirable and expressed by impulse ratio

42. Glass insulator cannot be used for voltage above _____

a) 25 KV

b) 11 KV

c) 33 KV

d) 50 KV

43. Which of the following location is suitable to use shackle insulator?

a) Sharp Turn in transmission line

b) Dead end of low voltage distribution line

c) For bearing High Voltage transmission line conductor

d) Dead end of EHV transmission line

44. Which of the following insulator is used for insulating stay wire from pole?

a) Pin type insulator

b) Shackle insulator

c) Suspension insulator

d) Stay insulator

45. What is the reason for unequal distribution of voltage among different unit of suspension insulator?

a) Unequal capacitance of different units

b) Unequal distribution of charging current caused by stray capacitance

c) Unequal resistivity of different units

d) Dirt deposited over the insulator disc

46. Arcing horns are used for _____

a) protecting insulators from birds

b) protecting insulators from cracking or breaking due to flash over

c) improving string efficiency

d) protecting insulator from deposition of dirt

47. What is the effect of rain on string efficiency?

a) It becomes very low

b) It reduces slightly

c) It does not changes

d) It is improved

48. By using which of the following method hundred percent string efficiency can be achieved?

a) Using long cross arms

b) Capacitance grading

c) Static shielding

d) 100% string efficiency cannot be achieved

49. If voltage across lowermost unit of a string is 34.8% of voltage across whole string and string efficiency is 57.46%. What is the voltage across whole string.

a) 100%of line voltage

b) 43.64% of line voltage

c) 75.2% of line voltage

d) 92.26% of line voltage

50. A suspension string have 3 units. Voltage across topmost and lower most unit of string are 6.71 volts and 11 volts respectively. What is the voltage across middle string, if voltage across whole string is 25.76 volts?

a) 103.47 volts

b) 8.05 volts

c) 83.6 volts

d) 25.76 volts

Transmission line

1. The skin effect is a phenomenon observed in
   a) Insulators
   b) Dielectrics
   c) Conductors
   d) Semiconductors

2. The skin depth is measured in
   a) Meter
   b) Millimetre
   c) Centimetre
   d) Micrometer

3. The skin depth is calculated from the amplitude of the wave. State true/false
   a) True
   b) False

4. The skin depth is used to find which parameter?
   a) DC resistance
   b) AC resistance
   c) Permittivity
   d) Potential

5. The relation between the skin depth and frequency is given by
   a) Skin depth α f
   b) Skin depth α 1/f
   c) Skin depth α $\sqrt{f}$
   d) Skin depth α $1/\sqrt{f}$

6. A perfect dielectric acts as a
   a) Perfect transmitter
   b) Perfect reflector
   c) Bad transmitter

d) Bad reflector

7. A perfect conductor acts as a
   a) Perfect transmitter
   b) Perfect reflector
   c) Bad transmitter
   d) Bad reflector

8. Capacitance in equivalent circuit of transmission line is due to
   a) Current in the line
   b) Difference in potential of line
   c) Leakage of current
   d) Presence of magnetic flux

9. Skin effect in conductor is proportional to
   a) (diameter of conductor).$^{1}/^{2}$
   b) diameter of conductor.
   c) (diameter of conductor).^{2}
   d) (diameter of conductor).^{4}

10. Proximity effect
    a) Is more pronounced for large conductors, high frequencies and close proximity
    b) Increases the resistance of the conductors and reduces the self-reactance
    c) Is substantially eliminated with stranded conductors
    d) All of these

11. Which of the following is neglected while analyzing a short transmission line?
    a) Power losses
    b) shunt admittances
    c) Series impedance
    d) None of these

12. . Following effects are associated with transmission lines

1. Skin effect
2. Corona effect
3. Proximity effect

The effective resistance of conductor is increased by

a) 1 only
b) 2 and 3 only
c) 1 and 3 only
d) 1,2 and 3

13. Percentage regulation of transmission line is given by the expression

a) $(V_R - V_S)/V_R \times 100$
b) $(V_R - V_S)/V_S \times 100$
c) $(V_S - V_R)/V_R \times 100$
d) $(V_S - V_R)/V_S \times 100$

14. Shunt capacitance is neglected in case of

a) Medium and long transmission lines
b) Long transmission lines
c) Medium transmission lines
d) Short transmission lines

15. Proximity effect is more in case of

a) Power Cables
b) Overhead lines
c) Same in both cases
d) None of the above

16. Proximity effect depends on

a) frequency
b) Distance between the conductors
c) Relative permeability
d) all of the above

17. Skin effective is more in case of

a) communication lines
b) power lines
c) same in both cases

d) none of the above

18. Apart from the skin effect the non uniformity of the current distribution is also caused by
a) bundled conductors
b) Ferranti effect
c) proximity effect
d) all of above

19. Transmission lines are transposed to reduce
a) Ferranti effect
b) skin effect
c) proximity effect
d) interference with neighbouring communication lines

20. In transmission lines distribution constants are
a) resistance
b) inductance and capacitance
c) inductance and resistance
d) both 1 and 2

21. The skin effect of conductor will increase when
a) diameter decrease
b) resistivity decrease
c) frequency decrease
d) all of above

22. Due to proximity effect, the increase in conductor resistance is not negligible in
a) underground cable
b) over head transmission line
c) communication lines
d) all of the above

23. The fact that current density is higher at the surface when compared to centre is known as
a) corona
b) proximity effect
c) skin effect
d) all of above

24. The presence of earth in case of overhead lines
a) increase inductance
b) increase capacitance
c) decrease inductance
d) decrease capacitance

25. the term self GMD is used to calculate
a) capacitance
b) inductance
c) resistance
d) both 1 and 2

26. Inductance of transmission line will decrease when
a) both GMD and GMR increase
b) both GMD and GMR decrease
c) GMD increase and GMR decrease
d) GMD decrease and GMR increase

27. If we increase the spacing between the phase conductors, the line capacitance
a) Increases
b) decreases
c) remains unaffected
d) none of the above

28. If we increase the length of the transmission line, the charging current
a) Increases
b) decreases
c) remains unaffected
d) none of the above

29. Length of long transmission line is more than _____
a) 80 Km
b) 50 Km
c) 120 Km
d) 200 Km

30. In long transmission lines Resistance and Capacitance parameters of lines are connected in _____
a) Series, shunt
b) Series, series
c) Shunt, shunt
d) Shunt, parallel

31.Range of surge impedance for an overhead transmission line is _____
a) 12 Ω – 144 Ω
b) 40 Ω – 60 Ω
c) 400 Ω – 600 Ω
d) 300 Ω – 900 Ω

32. Range of surge impedance for an underground cables is _____
a) 12 Ω – 144 Ω
b) 40 Ω – 60 Ω

c) 400 Ω – 600 Ω
d) 300 Ω – 900 Ω

33. Synchronous phase modifiers are installed at which of the following position of the transmission line?
a) Reciving end
b) Sending end
c) Between reciving end and sending end
d) Near reciving end

34. The voltage rating of long transmission line is _____
a) 20 KV to 100 KV
b) Upto 20 KV
c) Above 100 KV
d) 60 KV to 80 KV

35. The shunt capacitive susceptance in long transmission line is greater than that in medium and short transmission line.
a) True
b) False

36. What is the value of characteristics impedance for loss free transmission line?
a) √(L/C)
b) √(R/C)
c) √(LC)
d) √(C/L)

37. The leakage current through the shunt admittance is _____
a) Maximum at sending end
b) Maximum at receiving end
c) Uniform over length of line
d) Maximum at centre of line

38. Value of leakage current at reciving end of transmission line is zero.
a) True
b) False

39. Which of the following parameters is not a primary parameter?
a) Resistance
b) Attenuation constant
c) Capacitance
d) Conductance

40. The networks in which the R, L, C parameters are individually concentrated or lumped at discrete points in the circuit are called
a) Lumped

b) Distributed
c) Parallel
d) Paired

41. The lines having R, L, C distributed along the circuit are called
a) Lumped
b) Distributed
c) Parallel
d) Paired

42. Which primary parameter is uniformly distributed along the length of the conductor?
a) G
b) C
c) L
d) R

43. The primary parameter that is associated with the magnetic flux linkage is
a) R
b) L
c) C
d) G

44. The primary parameter that is associated with the electric charges is
a) G
b) R
c) C
d) L

45. The leakage current in the transmission lines is referred to as the
a) Resistance
b) Radiation
c) Conductance
d) Polarisation

46. Find the receiving impedance of a transmission line having a voltage of 24V and a conduction current of 1.2A is
a) 25.2
b) 22.8
c) 28.8
d) 20

47. The characteristic impedance of a transmission line with impedance and admittance of 16 and 9 respectively is
a) 25
b) 1.33

c) 7
d) 0.75

48. The propagation constant of a transmission line with impedance and admittance of 9 and 16 respectively is
a) 25
b) 144
c**) 12**
d) 7

49. Find the characteristic impedance expression in terms of the inductance and capacitance parameters.
a) Zo = √(LC)
b) Zo = LC
c) Zo = √(L/C)
d) Zo = L/C

50. When a transmission line has a load impedance same as that of the characteristic impedance, the line is said to be
a) Parallel
b) Perpendicular
c) Polarized
d) Matched

Substation

1. Which of the following sections can be employed for bus-bars?
   A. Bars
   B.Rods
   C. Tubes
   D. Any of the above

2. The material used for bus-bar should have

   A. Low resistivity
   B. Low-cost
   C. High Softening temperature
   D. All of the above

3. In a substation the following equipment is not installed
   A. Exciters
   B. Series capacitors
   C. Shunt reactors
   D. Voltage transformers

4. With which of the following are step-up substations associated ?
   A. Concentrated load
   B. Consumer location
   C. Distributors
   D. Generating stations

5. Stones are provided in the substation to:
   a) To avoid fire accident by draining oil from transformer if leaks
   b) To avoid growing of weeds and plants
   c) To provide insulation
   d**)** All the above

6. In order to improve the power factor ___ device is employed in the substation
   a) Synchronous condenser
   b) Synchronous reactor
   c) Series Capacitors
   d) None of the above

7. What is the minimum phase to phase clearance required for 400kV conductors in substation:
   a) 3500 mm
   b) 4200 mm

c) 5000 mm
d) 4500 mm

8. In substation which of the device is a carrier communication device:
a) CVT
b) Earth conductor
c**)** Wave trap
d) Lightning arrestor

9. Which of the device is employed in substation to limit the short circuit current in the power system:
a) Shunt condenser
b) Reactor
c) Series capacitor
d) Shunt capacitor

10. Which of the following busbar arrangement is generally employed in distribution system:
a) One-and-half breaker arrangement
b) Main and transfer arrangement
c) Ring main distribution system
d) Single busbar arrangement system

11. Earthing conductivity is affected by:
a) Moisture content in the soil
b) Chemical composition
c) Concentration of salts in the soil
d) All the above

12. Emulsifier protection is associated with:
a) Grounding protection
b) Dielectric strength protection of cables and conductors
c) Lightning protection
d) Fire protection

13. The size of Gas Insulated Substation is significantly small compared to conventional substation because:
a) High electronegative property of SF6 gas
b) High dielectric property of SF6 gas
c) High Insulation property of SF6 gas
d) All the above

14. What is Marshalling Kiosk in power transformer:
a) It provides alarms, trips, controls and indications from main transformer
b) It is the base on which transformer rail is provided to pull and push transformer
c) It is the pressure device ruptures when temperature inside transformer increases

d) None of the above

15. Outdoor Sub Station requires .....space
A. Less
B. More
C. Medium
D. Any of the above

16. Majority of distribution substations are of ..... type.
A. Pole mounted
B. Indoor
C. Outdoor
D. All of the above

17. Power factor correction substations are generally located at the .....end of a transmission line
A. Sending
B. Receiving
C. Both sending and receiving
D. None of the above

18. Underground sub stations are generally located in .....
A. **Thickly polluted area**
B. Villages
C. Cities
D. Any of the above

19. An indoor Sub Station is .....expensive than outdoor Sub Station
A. More
B. Less
C. Almost equal
D. None of the above

20. Pole mounted sub stations are used for..... distribution

A. Primary
B. Secondary
C. Both A and B
D. None of the above

21. The voltage rating of the transformer in a pole-mounted Sub Station is.....

A. 11 KV / 400 V

B. 11 KV / 240 V
C. 33 KV / 400 V
D. None of the above

22. Single bus-bar arrangement in substations is used for voltage is less than.....

A. 11 KV
B.33 KV
C. 132 KV
D. 220 KV

23. For voltage is greater than 33 KV, ...Busbar arrangement is employed

A. Single
B. Double
C. Duplicate
D. None of the above

24. For cost and safety the outdoor substations are installed for voltages above

A. 11 KV
B. 33 KV
C. 66 KV
D. 132 KV

25. The neutral wire is coloured

A. Black
B. Blue
C. Red
D. Yellow

26. In case of earth fault, the underground neutral system .....lead to arcing ground

A. Does
B. Does not
C. Any of the above
D. None of the alarm

27. Grounding transformer is used where neutral .....available

A. Is
B. Is not
C. Either A or B
D.. None of the above

28. The ground wire is coloured

A. Green
B. Black
C. Yellow
D. Red

29. In equipment grounding, the enclosure is connected to .....wire

A. Ground
B. Neutral
C. Phase
D. Either A or B

30. Earthing is necessary to give protection against

A. Danger of electric shock
B. Voltage fluctuation
C. Overloading
D. High temperature of the conductors

31.Solid grounding is addopted for voltages below

A. 100 V
B. 200 V
C. 400 V
D. 660 V

32. The advantage of neutral earthing is

A. Freedom from persistent arcing grounds
B. Over voltages due to lightning can be discharged to earth
C. Simplified design earth fault protection

D. All of the above

33. In a star connected system without neutral grounding, zero sequence currents are

A. Zero
B. Phaser sum of phase currents
C. Same as r.m.s. value of phase currents
D. Same as peak value of phase currents

34.The advantage of neutral earthing

A. Safety of personnel
B. Reduction of earth fault current
C. Elemination of arcing ground
D. None of the above

35. Which among these uses a low voltage DC source?

a. Remote indication
b. Emergency lighting system
c. Remote position control
d. All of these

36. Which sequence is followed first while closing a circuit breaker?
a. Close the isolator
b. Open earthing switch
c. Close circuit breaker
d. Any of these

37. Which equipment is used for EHV lines to improve power transferability?
a. Shunt capacitor
b. Shunt reactor
c. Series capacitor
d. All of these

38. Which among these is a configuration of an isolator?
i. Vertical break type
ii. Horizontal type
iii. Horizontal break with two post insulator
iv. Horizontal break centre post rotating double break

v. Pantograph type
a. Only ii and iii
b. i, ii, iii, and iv
c**.** i, ii, iii, iv, v
d. i, ii, iv, v

39.Which among these is a type of surge arrestor?
a. Conventional gapped arrestors
b. Metal oxide arrestors
c**.** Both (A) and (B)
d. None of these

40. Which among these types of bus bars can be used outdoor?

a. Tubular
b. ACSR
c. AAC
d**.** All of these
e. None of these

41. Which material is used for indoor bus bar?
a**.** Copper
b. Aluminum
c. Silver
d. Both (A) and (B)

42 What is / are the types of substations suitable for voltage 66 kV and above?
a. Conventional outdoor
b. SF^ gas insulated metal enclosed substation
c. Hybrid substation
e**.** All of these

43. Due to which of the following reasons aluminum is being favored as bus-bar material?
A. Low-density
B. Low-cost
C. Ease of fabrication
D. None of the above

44. Which of the following bar schemes is the most expensive?
A. Double bus-bar double breaker
B. Ring bus-bar scheme
C. Single bus-bar scheme

D. Main and transfer scheme

45. When an alternator connected to the bus-bar is shut down the bus-bar voltage will
A. Fall
B. Rise
C. Remain unchanged
D. none of the above

46.The bus-bar zone, the purpose of protection includes ....., ...and .....
A. Bus-bars, isolating switches, circuit breakers
B. Transformers, relays, circuit breakers
C. Transformers, conductors and relays
D. None of the above

47. If a voltage controlled bus is treated as a load bus, then which one of the following limits would be violated ?
A. Voltage
B. Active power
C. Reactive power
D. Phase angle

48. Single bus-bar arrangement
A. Is cheapest in initial as well as maintenance cost
B. Provide simple operation and relaying system
C. Has the drawback that there will be complete shut down when a fault occurs on the bus itself
D. All of the above

49.In a single bus bar system there will be complete shutdown when
A. Fault occurs on the bus itself
B. Fault occurs on neutral line
C. Two or more faults occur simultaneously
D. Fault occurs with respect to earthing

50.At what pressure is the SF_6 gas filled in the whole installation of GIS substations?
a**.** 3 kg / cm^2
b. 5 kg / cm^2
c. 3 kg / m^2
d. 5 kg / m^2