**POWER SYSTEMS**

# What is the element of the graph that is not included in the tree called?

1. Links
2. Branches
3. Oriented graph
4. All of these

# Ans: a

1. **What happens in case of capacitance of line to ground,if the effect of earth is taken into account?**
2. Capacitance of line to ground decreases
3. Capacitance of line to ground increases
4. The capacitance remains unaltered
5. The capacitance becomes infinite

# What is the value of capacitance to neutral for the two wire line?

1. Twice the line to line capacitance
2. Equal to line to line capacitance
3. Thrice the line to line capacitance
4. Half of line to line capacitance

# Ans: b

**Ans: a**

1. **A two conductor single phase line operates at 50Hz. Diameter of each conductor is 20mm and the spacing between the conductors is 3m. The height of the conductors above the ground is 6m. What is the capacitance of the line to neutral?**

a. 9.7 pF/m. b. 10.8 pF/m. c. 3.57 pF/m.

d. 2.415 pF/m.

# Ans: a

1. **What happens if the separation between the three phases of the transmission line is increased?**
2. The inductance will increase and capacitance will remain unchanged.
3. Both inductance and capacitance will decrease.
4. Inductance will increase and capacitance will decrease.
5. Inductance will decrease and capacitance will increase

# Ans: c

1. **What will be the capacitance of a 100 km long, 3 phase, 50Hz overhead**

**transmission line consisting of 3 conductors, each of 2 cm and spaced 2.5 m at the corners of an equilateral triangle?**

1. 1.007 μ F/phase
2. 2.0075 μ F/phase
3. 2.5 μ F/phase
4. 1.45 μ F/phase

# Ans: a

1. **If the double circuit 3 phase line has conductors of diameter 2 cm and distance of separation 2m in hexagonal spacing. What is the phase to neutral capacitance for 150 km of line?**

a. 2.4939 μ F b. 3.7408 μ F c. 1.8245 μ F d. 3.2548 μ F

# Ans: b

1. **What is the charging current per km for the transmission line shown in the figure. Operating at 132 kV, the conductor diameter is 0.8 cm.**

a. 0.314 A/km

1. 0.21 A/km
2. 0.45 A/km
3. 0.11 A/km

# On what concept is electrically short, medium and long lines based?

1. Nominal voltage of the line
2. Physical length of the line
3. Wavelength of the line
4. Power transmitted over the line

# Ans: b

**Ans: b**

1. **The capacitance effect can be neglected in which among the transmission lines?**
2. Short transmission lines
3. Medium transmission lines
4. Long transmission lines
5. All of these

# Ans: a

1. **In the modelling of short length overhead transmission line, why is the line capacitance to ground not considered?**
2. Equal to zero
3. Finite but very small
4. Finite but very large
5. Infinite

# Ans: b

1. **In a short transmission line, voltage regulation is zero when the power factor angle of the load at the receiving end side is equal to .**
2. tan-1 (X/R)
3. tan-1 (R/X)
4. tan-1 (X/Z)
5. tan-1 (R/Z)

# Ans: b

1. **What is the power factor angle of the load for maximum voltage regulation?**
2. tan-1 (X/R)
3. cos-1 (X/R)
4. tan-1 (R/X)
5. cos-1 (R/X)

# Ans: a

1. **A single phase transmission line of impedance j0.8 ohm supplies a resistive load of 500 A at 300 V. The sending end power factor is**
2. Unity
3. 0.8 lagging
4. 0.8 leading
5. 0.6 lagging

# Ans: d

1. **For a short line if the receiving end voltage is equal to sending end voltage under loaded conditions**
2. The sending end power factor is unity.
3. The receiving end power factor is unity.
4. The sending end power factor is leading.
5. The receiving end power factor is leading

# Ans: d

1. **What is the line length if a load of 15000 kW at a power factor 0.8 lagging can be delivered by a 3 phase transmission line having conductors each of resistance 1 Ω per kilometer? The voltage at the receiving end is to be 132kV and the loss is about 5%.**

a. 40.13km b. 37.18km c. 42.38km d. 35.87km

# Ans: b

1. **What are the values of A, B, C, D parameters of a short transmission line?**

a. Z, 0, 1, 1

b. 0, 1, 1, 1

c. 1, Z, 0, 1

d. 1, 1, Z, 0

# Ans: c

1. **The ABCD constants of a 3 phase transposed transmission line with linear and passive elements .**
2. are always equal
3. never equal
4. only A and D are equal
5. only B and C are equal

# Ans: c

1. **For a transmission line which among the following relation is true?**
2. –AB + CD = 1
3. AD + BC = 1
4. AB – CD = -1
5. –AD + BC = 1

# A line of what length can be classified as a medium transmission line?

a. 90 – 100 km

b. 50 – 150 km

c. 150 – 200 km

d. Above 200 km

# Ans: d

**Ans: b**

1. **Which among the following methods are used for the calculation of solution of a medium transmission line?**
2. End condenser method
3. Only T method
4. Only p method
5. All of these

# Ans: d

1. **What are the A and D parameters in case of medium transmission line (nominal T method)?**

a. A = D = 1 + (YZ / 2)

b. A = D = 1 + (YZ / 2) \* Z

1. A = D = (YZ / 2)
2. A = D = (YZ / 2) \* Y

# Ans: a

1. **In the nominal p method which among these are divided into two halves?**
2. Series impedance
3. Shunt capacitance
4. Both (A) and (B)
5. None of these

# Ans: b

1. **What is the value of B parameter in case of nominal p method?**
2. Y
3. Z

c. Y \* (1 + YZ / 4) d. Z \* (1 + YZ / 4)

# Ans: b

1. **What is the value of the C parameter by using a nominal T method for a 3 phase balanced load of 30 MW which is supplied by a 132 kV, 50 Hz and 0.85 pf lagging? The series impedance of a single conductor is (20 + j52) Ω and the total phase to neutral admittance is 315 \* 10-6 siemen.**

a. 0.000315 ∠ 90

b. 0.000251 ∠ 90

c. 0.004125 ∠ 90

d. 0.000289 ∠ 90

# The transmission lines above what length is termed as the long lines?

1. More than 100 km
2. 150 km and above
3. 250 km and above
4. Less than 100 km

# What happens in a long transmission lines under no load?

1. The receiving end voltage is less than the sending end voltage.
2. The sending end voltage is less then receiving end voltage.
3. The sending end voltage is equal to receiving end voltage.
4. None of these

# What is the normal range of angle for the parameter A?

a. 90 °

b. 70 ° - 40 °

c. 40 ° - 10 °

d. 0 - 10 °

# Ans: a

**Ans: b**

**Ans: b**

**Ans: d**

1. **The ABCD parameter of a 3 phase transmission line is given as follows**

A = D = 0.8 ∠ 1 °, B = 170 ∠ 85 ° Ω , and C = 0.002 ∠ 90.4 ° ℧ the sending end voltage is 400 kV. What is the receiving end voltage under no load condition?

1. 400 kV
2. 500 kV
3. 320 kV
4. 417 kV

# Ans: b

1. **The ABCD parameter of a 3 phase transmission line is given as follows A = D = 0.9 ∠ 0 °, B = 200 ∠ 90 ° Ω , and C = 0.95 \*10-3 ∠ 90 ° ℧ .**

**shunt inductive reactor is connected at the receiving end of the line to limit the receiving end voltage to be equal to the sending end voltage. What is the load condition a ohmic value of the reactor?**

a. Infinity b. 2000 Ω c. 105.26 Ω d. 1052.6 Ω

# The value of A parameter of a transmission line

1. Increases with increase in length of line
2. Decreases with increase in line length
3. Is independent of line length
4. None of these

# Ans: b

**Ans: a**

1. **Transmission efficiency of a transmission line increases with the**

**.**

1. decrease in power factor and voltage.
2. increase in power factor and voltage.
3. increase in power factor but decrease in voltage.
4. increase in voltage and decrease in power factor

# Ans: b

1. **When does the Ferranti effect happen on the transmission line?**
2. When the line is short and loaded.
3. When the line is long and loaded.
4. When the line is long and unloaded.
5. None of these.

# Ans: c

1. **When is the Ferranti effect on the long transmission lines experienced?**
2. The line is lightly loaded.
3. The line is heavily loaded.
4. The line is fully loaded.
5. The power factor is unity.

# Ans: a

1. **Transmission of power by ac cables is impossible beyond**

a. 35 – 45 km

1. 500 km
2. 300 km

d. 10 – 15 km

# What does the bedding on the cable consists of?

1. Jute strands
2. Hessian type
3. Paper tape compounded with a fibrous material
4. Any of these

# Ans: a

**Ans: d**

1. **Why are sheaths used in cables?**
2. Provide proper insulation
3. Provide mechanical strength
4. Prevent ingress of moisture
5. None of these

# Why are conduit pipes employed?

1. To protect unsheathed cables
2. Armoured cables
3. PVC sheathed cables
4. All of these

# Ans: c

**Ans: a**

1. **The thickness of insulation layer provided on the conductor, in cables depend on .**
2. Operating voltage
3. Current to be carried
4. Power factor
5. All of these

# Ans: a

1. **Which among the following formulae is used for addition of an admittance element into the bus?**
2. Yii new = Yii old - y
3. Yii new = Yii old + y
4. Yii new = Yii old - Yij old
5. Yii new = Yii old + Yij old

# Ans: b

1. **What is an oriented graph?**
2. A connection of network topology, represented by replacing all physical elements by lines.
3. A graph in which the direction is assigned to each branch.
4. A graph where at least one path exists between any two nodes of the graph.
5. None of these

# Ans: b

1. **What is / are the cause(s) for transient disturbance?**
2. Sudden load changes
3. Faults in the power system
4. Switching operations
5. All of these

# ANS: d

1. **Which among these phenomenon’s is / are associated with angle stability?**
2. Imbalance between the two generator torque
3. Stability or synchronism is lost
4. Surplus energy is stored up in the rotating masses
5. All of these

# ANS: d

1. **What is the value of transient stability limit?**
2. Higher than steady state stability limit
3. Lower than steady state stability limit.
4. Depending upon the severity of load
5. All of these

# ANS: b

1. **By using which component can the transient stability limit of a power system be improved?**
2. Series resistance
3. Series capacitor
4. Series inductor
5. Shunt resistance

# ANS: b

1. **What is transient stability limit?**
2. The maximum flow of power through a particular point in the power system without loss of stability when small disturbances occur.
3. The maximum power flow possible through a particular component connected in the power system.
4. The maximum flow of power through a particular point in the power system without loss of stability when large and sudden disturbances occur
5. All of these

# ANS: c

1. **Which among the following methods is used for improving the system stability?**
2. Increasing the system voltage
3. Reducing the transfer reactance
4. Using high speed circuit breaker
5. All of these

# What is steady state stability limit?

**ANS: d**

1. The maximum flow of power through a particular point in the power system without loss of stability when small disturbances occur.
2. The maximum power flow possible through a particular component connected in the power system.
3. The maximum flow of power through a particular point in the power system without loss of stability when sudden disturbances occur
4. All of these

# ANS: a

# Which among these is a classification of power system stability?

1. Frequency stability
2. Voltage stability
3. Rotor angle stability
4. All of these

# ANS: d

1. **The stability of the power system is not affected by which among these?**
2. Generator reactance
3. Line losses
4. Excitation of generators
5. All of these

# What is power system stability?

**ANS: b**

1. The maximum power flow possible through a particular component connected in the power system.
2. The ability of the power system to regain the state of operating equilibrium point when the system is subjected to any disturbances.
3. It is a phenomenon in which a power system losses its operating equilibrium when subjected to large disturbances.
4. All of these

# ANS: b

1. **How are the zero sequence and negative sequence networks connected in case of LLG faults?**
2. Parallel
3. Series
4. Can be connected in either way
5. Such type of connection does not exist

# ANS: a

1. **What is the expression for the current Ia2, if a double line to ground fault occurs on an unloaded generator through fault impedance?**

**a.** Ia2 = - Ia1 \* (Z0 + 3Zf) / ( Z0 + Z2 + 3Zf)

**b.** Ia2 = - Ia1 \* (Z0 + 3Zf + Z2) / ( Z0 + Z2 + 3Zf)

**c.** Ia2 = - Ia0 \* (Z0 + Zf) / ( Z0 + Z2 + 3Zf)

**d.** Ia2 = - Ia1 \* Z2 \* (Z0 + 3Zf) / ( Z0 + Z2 + 3Zf)

# ANS: a

1. **What is the value of fault current If, if the neutral grounding is absent in LLG fault?**

**a.** If = - 3 Ia1 ( Z2 / Z2 + Z1)

**b.** If = 0

**c.** If = √3 \* (Ea / Z1 + Z2 + Z0)

**d.** If = 3 \* (Ea / Z1 + Z2 + Z0)

# ANS: b

1. **What will be the value of current Ia, if the fault occurs between the lines B, C and ground?**
2. Ia = 1
3. Ia = 0
4. Ia = ∞
5. Ia = - (Ib + Ic )

# ANS: b

# What percentage of fault occurring in the power system is LLG fault?

**a.** 20 %

**b.** 30 %

**c.** 5 %

**d.** 10 %

# ANS: d

1. **What percentage of fault occurring in the power system is line to line fault?**

**a.** 5 % **b.** 30 % **c.** 25 % **d.** 15 %

1. **What is the expression for fault current in line to line fault? a.** If = √3 \* (Ea / Z1 + Z2)

**b.** If = 3 \* (Ea / Z1 + Z2)

**c.** If = √3 \* (Ea / Z1 + Z2 + Z0)

**d.** If = 3 \* (Ea / Z1 + Z2 + Z0)

# What is the value of zero sequence impedance in line to line faults?

1. Z0 = 1
2. Z0 = ∞
3. Z0 = 3 Zn
4. Z0 = 0

# Which among the following matrix is sparse?

1. Jacobian matrix only
2. Y bus matrix only
3. Z bus matrix only
4. Both (a) and (b)

# ANS: d

**ANS: a**

**ANS: d**

**ANS: d**

1. **What is the main drawback in NR method?**
2. Slow to converge
3. A large memory allocation is required to store the jacobian matrix
4. The number of iterations is more
5. All of these

# Which types of equations are solved using Newton Raphson method?

1. Non linear differential equations
2. Linear differential equations
3. Non linear algebraic equations
4. Both (a) and (b)

# ANS: b

**ANS: c**

1. **To control which among the following is the regulating transformer used in a power system?**
2. Power flows
3. Frequency
4. Voltage
5. Power factor

# ANS: a

# What is the value of acceleration factor used in the GS method?

**a.** 2.3 – 2.7

**b.** 1.6 – 2.0

**c.** 1.2 – 1.5

**d.** 2.4 – 2.9

# ANS: b

1. **Which among the following is the main assumption to solve a load flow problem by GS method?**
2. All the buses are to be considered as PQ bus including the slack bus.
3. All the buses are to be considered as PV bus including the slack bus.
4. All the buses are to be considered as PQ bus excluding the slack bus.
5. All the buses are to be considered as PV bus excluding the slack bus.

# ANS: c

1. **Which among the following buses constitute the maximum number in a power system?**
2. Slack bus
3. P Q bus
4. P V bus
5. All of these

# Which among theses quantities are to be determined in slack bus?

1. P and Q
2. Q and |V|
3. |V| and δ
4. Q and δ

# ANS: b

**ANS: a**

1. **What will be the sum of (IB + IY) in case of line to line fault, if the fault is occurring in the B and Y lines?**
2. ∞
3. 0
4. 1
5. IR

# ANS: b

1. **What happens to the value of the fault current in case of SLG fault, if fault impedance is introduced?**
2. The fault current increase
3. The fault current remains same as in case of SLG fault.
4. The fault current becomes zero
5. The fault current is reduced

# ANS: d

1. **What happens if the neutral is not grounded in case of the single line to ground fault?**
2. Only the zero sequence impedance will be zero
3. The zero sequence impedance will be infinite
4. Fault current will be zero
5. Both (b) and (c)

# ANS: d

# What is the value of fault current If , in case of SLG fault?

**a.** 3 \* (Ea / Z1 + Z2 + Z0)

**b.** 2 \* (Ea / Z1 + Z0)

**c.** 3 \* (Ea / Z1 + Z2 )

**d.** 2 \* (Ea / Z1 + Z2 + Z0)

# ANS: a

1. **What are the terminal conditions in case of SLG fault, if the fault occurs in the phase A?**
2. Vb = 0, Ia = 0, Ic = 0
3. Va = 0, Ib = 0, Ic = 0
4. Va = 0, Ia = 0, Ic = 0
5. Vb = 0, Ia = 0, Ib = 0

# ANS: b

1. **What percentage of faults occurring is single line to ground fault?**

**a.** 50 %

**b.** 60 %

**c.** 35 %

**d.** 70 %

# ANS: d

1. **What are the types of unsymmetrical faults?**
2. Single line to ground fault
3. Double line to ground fault
4. Line to line fault
5. All of these

# What happens to the zero sequence currents, if the neutral in the Y connection is absent?

1. Minimum
2. Zero
3. Maximum
4. ∞

# ANS: d

**ANS: b**

1. **Zero sequence currents cannot flow in which of the following connections?**
2. Delta
3. Star
4. Star – star
5. Both (b) and (c)

# What is the value of negative sequence impedance?

1. 1
2. Z
3. Same as positive sequence
4. ∞

# ANS: a

**ANS: c**

# In the absence of neutral what will be the value of Z0 ?

1. 1
2. 0
3. Z
4. ∞

# Why are series reactors used?

**Ans: d**

1. Improve the transmission efficiency
2. Improve the power factor of the power system
3. To bring down the fault level with in the capacity of the switchgear instrument
4. All of these

# Ans: c

1. **What are zero sequence components?**
2. Three balanced phasors of equal magnitude and displaced by 120°
3. Three balanced phasors displaced by 120° and having phase sequence opposite to that of the original phasors.
4. Three phasors with equal magnitude and zero displacement.
5. None of these

# What does the positive sequence component consist of?

1. Three balanced phasors of equal magnitude and displaced by 120°
2. Three unbalanced phasors displaced by 120°
3. Three phasors with equal magnitude and zero displacement.
4. None of these

# What is the percentage of occurrence of symmetrical faults? a. 10 %

**b.** 15 %

1. 5 %
2. None of these

# Ans: c

**Ans: a**

**Ans: c**

1. **What will be the multiplying factor if the speed of the circuit breaker is 2 cycles?**

**a.** 2.2

**b.** 1.2

**c.** 2.8

**d.** 1.4

# Ans: d

1. **If the speed of the circuit breaker is 8 cycles or slower than that what will be the multiplying factor?**

**a.** 2.3

**b.** 1.0

**c.** 1.5

**d.** 1.7

# Ans: b

# What is the rated breaking capacity of the circuit breaker?

1. The product of rated voltage and rated breaking current
2. The product of rated voltage and rated symmetrical breaking current
3. The product of fault voltage and breaking current
4. None of these

# What is the multiplication factor to be multiplied with symmetrical momentary current to account for the presence of DC off set current? a. 1.2

**b.** 1.5

**c.** 1.6

**d.** 2.5

# Ans: b

**Ans: c**

1. **Which among the following methods are generally used for the calculation of symmetrical faults?**
2. Norton theorem
3. Thevnin’s theorem
4. Kirchhoff’s laws
5. Only (b) and (c)

# Which among the following reactance have a greater value?

1. Sub transient reactance
2. Transient reactance
3. Synchronous reactance
4. All of these

# On which among the following factors does the magnitude of the fault current depend?

1. Total impedance upto the fault.
2. Voltage at the fault point
3. Both (a) and (b)
4. None of these

# Which among these is the most severe fault?

1. Single line to ground fault.
2. Double line to ground fault
3. Line to line fault
4. Symmetrical fault.

# Which among these is the most commonly occurring fault?

1. Single line to ground fault.
2. Double line to ground fault
3. Line to line fault
4. Fault due to all the three phases to earth.

# Which of the following fault results into a three phase faults?

1. Single line to ground fault.
2. Double line to ground fault
3. Line to line fault
4. Fault due to all the three phases to earth.

# Ans: d

**Ans: c**

**Ans: c**

**Ans: d**

**Ans: a**

**Ans: d**

# Which among the following assumptions are made in the reactance diagram?

1. The neutral reactance are neglected
2. Static loads are neglected.
3. The capacitance of the transmission lines are neglected
4. All of these

# What is the formula to calculate the (kV)B on the LT section?

1. (kV)B on HT section \* (HT voltage rating) / (LT voltage rating)
2. (kV)B on LT section \* (HT voltage rating) / (LT voltage rating)
3. (kV)B on HT section \* (LT voltage rating) / (HT voltage rating)
4. (kV)B on LT section \* (LT voltage rating) / (HT voltage rating)

# What is the formula to calculate the (kV)B on the HT section?

1. (kV)B on HT section \* (HT voltage rating) / (LT voltage rating)
2. (kV)B on LT section \* (HT voltage rating) / (LT voltage rating)
3. (kV)B on HT section \* (LT voltage rating) / (HT voltage rating)
4. (kV)B on LT section \* (LT voltage rating) / (HT voltage rating)

# What is infinite bus in power system?

1. A large system with infinite voltage
2. A large system in which the voltage and frequency varies
3. A large system whose voltage and frequency remains constant throughout.
4. Both (a) and (b)

# Which among these is the major advantage of per unit computations?

1. Per unit impedance of transformers is the same referred to either side of it.

# Ans: d

**Ans: c**

**Ans: b**

**Ans: c**

1. For simulating steady state and transient models in the computer this method is very useful.
2. Manufactures usually specify the impedance of an apparatus in per unit system.
3. All of these

# What will be the per unit impedance of a synchronous motor having a rating of 100 kVA, 13.2 kV and having a reactance of 75 Ω / ph?

**a.** 0.043 pu

**b.** 0.057 pu

**c.** 0.036 pu

**d.** 0.298 pu

# Ans: a

**Ans: a**

1. **What is the simplified diagram called, after omitting all resistances, static loads, capacitance of the transmission lines and magnetising circuit of the transformer?**
2. Single line diagram
3. Resistance diagram
4. Reactance diagram
5. Both (a) and (b)

# Ans: c

# What is the per unit system (PU)?

1. A ratio of actual value in any units to the base or reference value in the same units
2. A ratio of the base or reference value in any units to the actual value in the same units.
3. Ratio of the square of the actual value in any units to the square of base or the reference value in the same units
4. All of these

# Ans: a