# EHV AC TRANSMISSION

# QUESTION BANK

**QUESTION BANK**

**DESCRIPTIVE QUESTIONS:**

**UNIT-1:**

**Short Answer Questions-**

| S.No | Question | Blooms Taxonomy Level |
|---|---|---|
| **UNIT – I** | | |
| **PART – A (SHORT ANSWER QUESTIONS)** | | |
| **1** | Explain Necessity of EHVAC transmission | Understand |
| **2** | What is power handling capacity and line losses | Remember |
| **3** | Explain m**e**chanical considerations resistance of conductors, properties of bundled conductors | Understand |
| **4** | Give brief about bundle spacing and bundle radius, Line inductance and capacitances. | Understand |
| **5** | What is line inductance, capacitances? | Remember |
| **PART – B (LONGANSWER QUESTIONS)** | | |
| **1** | a)What are the merits and problems of EHVAC transmission?<br>b) A power of 2000 MW is to be transmitted from a super thermal power station in central India over 800 Km to Delhi. Use 400 KV and 750 KV alternatives. Suggest the number of circuits required with 50% series capacitor compensation and calculate the total power loss and loss per Km. | create |
| **2** | a) Explain the necessity of EHVAC transmission.<br>b) Illustrate the power handling capacity and line loss of EHVAC lines with various voltage levels. | Analyze |
| **3** | a) Give ten levels of transmission voltages that are used in the world.<br>b) What is the necessity of EHV AC Transmission? Explain its advantages. | create |

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| **4** | a) A single-circuit 3-phase 50 *Hz* 400 kV line has a series reactance per phase of 0.327 ohm/km. Neglect line resistance. The line is 400 km long and the receiving- end load is 600 MW at 0.9 p.f. lag. The positive-sequence line capacitance is 7.27 nF/km. In the absence of any compensating equipment connected to ends of line, calculate the sending-end voltage. Work with and without considering line capacitance. The base quantities for calculation are 400 kV, 1000 MVA.<br>b) Give ten levels of transmission voltages that are used in the world. | Apply |
| **5** | a) What are the different mechanical considerations in line performance and explain in detail?<br>b) What are the properties of Bundled conductors and explain with neat sketches? | Remember |
| **6** | Obtain the sequence inductances and capacitances of EHVAC lines | Create |
| **7** | Explain in detail capacitances and inductances of ground return and derive necessary expressions. | Understand |
| **8** | A 3-phase 750 kV horizontal line has minimum height of 12 m, sag at mid span = 12 m. Phase spacing $S$ = 15 m. Conductors are 4 × 0.035 m with bundle spacing of $B$ = 0.4572m. Calculate per kilometer:<br>a) The matrix of Maxwell's Potential coefficients for a un transposed configuration.<br>b) The inductance and capacitance matrices for un transposed and transposed configurations.<br>c) The zero-, positive-, and negative-sequence inductances | Apply |
| | and capacitances for transposed line.<br>d) The ground-return resistance and inductance matrices at 750 Hz taking *sr* = 100 ohm-meter. | |
| **9** | a) Why the Inductance and capacitance transformation required in Sequence Quantities in EHV-AC lines?<br>b) What are the Conductor configurations used for bundles in EHV lines and also explain properties of Bundled conductors? | Understand |
| **10** | Explain in detail the line parameters for modes of propagation and derive necessary expressions. | Understand |

| **S.No** | **Question** | **Blooms Taxonomy Level** |
|---|---|---|
| **UNIT – 2** | | |
| **PART – A (SHORT ANSWER QUESTIONS)** | | |

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| 1 | Explain the field of sphere gap | Understand |
| 2 | Explain in briefly about field of line changes and properties. | Understand |
| 3 | What are charge potential relations for multi-conductors? | Create |
| 4 | Give brief about surface voltage gradient on conductors. | Create |
| 5 | Explain the distribution of voltage gradient on sub-conductors of bundle | Understand |

**PART – B (LONG ANSWER QUESTIONS)**

| | | |
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| 1 | Obtain the maximum charge conduction on a 3-phase EHVAC lines. | Evaluate |
| 2 | A charge of 10 μC is placed at a distance of 2 m from the center of a sphere of radius 0.5 m. Calculate the magnitude, polarity and location of point charge Q2 which will make the sphere at zero potential. | Evaluate |
| 3 | Describe the charge-potential relations of a transmission line with *n* conductors on a tower. A single conductor EHV line strung above ground is used for experimental purposes to investigate high voltage effects. The conductors are of expanded ACSR with diameter of 0.06 cm and the line height is 21 m above ground | Remember |
| 4 | Find the charging current and MVAR of the single phase transformer for exciting 1Km length of the experimental line. Assume any, if necessary. | Evaluate |
| 5 | Derive general expression for the charge-potential relations for multi conductor lines: Maximum Charge Condition on a 3- | Create |
| | Phase Line. | |
| 6 | Explain the voltage gradient distribution on Six-conductor bundle and gradient on sub-conductor. | Understand |
| 7 | A point charge Q = 10 $^{-6}$ coulomb (1μC) is kept on the surface of a conducting sphere of radius r = 1 cm, which can be considered as a point charge located at the centre of the sphere. Calculate the field strength and potential at a distance of 0.5 cm from the surface of the sphere. Also find the capacitance of the sphere, $\varepsilon_r$. | Evaluate |
| 8 | Derive an expression for Maximum Charge Condition on a 3Phase Line. | Create |
| 9 | Determine the field of sphere gap in EHV AC system | Evaluate |

| S.No | Question | Blooms Taxonomy Level |
|---|---|---|
| **UNIT – 3** | | |
| **PART – A (SHORT ANSWER QUESTIONS)** | | |
| **1** | What is power loss and audible noise? | Understand |
| **2** | Explain Corona and give the corona loss formulae. | Understand |
| **3** | Explain charge and voltage diagram | Understand |
| **4** | Write about generation characteristics, limits & measurements of AN. | Understand |
| **5** | Explain the relation between 1-Phase and 3-phase AN levels. | Understand |
| **PART – B (LONGANSWER QUESTIONS)** | | |
| **1** | a) Describe the behavior of space- charge effects inside a corona envelope and discuss why load current cannot flow in a conductor inside the envelope even though it is conducting zone?<br>b) A voltage with magnitude of 500 KV crest is incident on conductor whose corona inception voltage is 100 KV crest and capacitance C= 10 nF/Km. After a lapse of 130 μsec, the measured amplitude is 120 KV. Calculate α and Ks. | Apply |
| **2** | a) Among HVAC and DC Transmission which one is best transmission, also mention the advantages and disadvantages of it.<br>b) The heights of conductors of a bipolar dc line are $H$ = 18 m | create |
| | and the pole spacing $P$ =12 m. Calculate and plot the field factors for this line for the two modes of propagation as the distance $d$ from line centre is varied from 0 to 3 H. | |
| **3** | a) Derive the expression for energy loss from the charge-voltage diagram with corona.<br>b) The following is the data for a 750 KV line. Calculate the corona loss per Km and the corona loss current.<br>Rate of rainfall ρ =5 mm/hr, K=5.35×10-10, PFW=5 KW/km V=750 KV line to line, H=18 m, S=15 m phase spacing, N= 4 sub conductors each of r=0.017m with bundle spacing B=0.457 m. Use surface voltage gradient on center phase for calculation. | Create |

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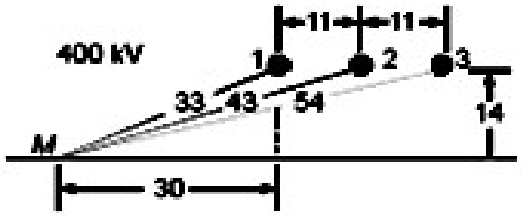
| **4** | a) Explain the generation and characteristics of audible noise. The AN level of one phase of a 3-phase transmission line at a point is 70 dB. b) Calculate:<br>i) The SPL in pascals<br>ii) If a second source of noise contributes 65 dB at the same location, calculate the combined AN level due to the two sources. | Understand |
| **5** | a) Obtain Procedure for the Excitation Function from CIGRE Formula.<br>b) Take an example and explain the excitation function and its propagation on line for RI calculation | Apply |
| **6** | Explain the lateral profile of RI and modes of propagation in EHV lines. | Understand |
| **7** | a) A 400-kV line has conductors in horizontal configuration at average height $H$ = 14 m and phase spacing $S$ = 11 m, as shown in Figure 1. The conductors of each phase are 2 × 0.0318 m diameter at $B$ = 0.4572 m spacing:<br>a) Calculate the RI level of each phase at a Distance of 30 m from the outer phases at ground level at 0.5 MHz at 420 kV using the CIGRE formula.<br>  <br>**Fig: 1** Calculation of RI level of 400-kV line using CIGRE formula.<br>b) Calculate the RI level of the line at the measuring point at 0.5 MHz and 1 MHz in fair weather.<br>c) If the RI limit is given to be 40 dB at 1 MHz, calculate the width of right-of-way of the line Corridor. | Apply |
| **8** | a) Write short notes on frequency spectrum of the RI field of line in E.H.V. lines.<br>b) Draw the circuit diagram for measuring Radio Influence Voltage (RIV) with respect to E.H.V. lines. | Create |
| **9** | a) Explain and describe the different cases for lateral profile of RI and modes of propagation.<br>b) Take an example and explain the excitation function and its propagation on line for RI calculation. | Understand |

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| **10** | a) Describe the mechanism of formation of positive corona pulse train.<br>b) Calculate and plot the field factor for the 3-modes of propagation for a line with H=15 m, S=12 m as the distance from the line center is varied from 0 to 3H. | Remember |

| **S.No** | **Question** | **Blooms Taxonomy Level** |
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| **UNIT – 4** | | |
| **PART – A (SHORT ANSWER QUESTIONS)** | | |
| **1** | Explain Traveling wave expression and solution, | Understand |
| **2** | What are the reflection and refraction coefficients? | Understand |
| **3** | Explain briefly lumped parameters of distributed lines. | Understand |
| **4** | What are the different sources of excitation? | Understand |
| **5** | Give the no load voltage conditions and charging current of line | Understand |
| **PART – B (LONGANSWER QUESTIONS)** | | |
| **1** | a) Explain the classification of shock currents?<br>b) Explain the effect of Electrostatic fields to human life, plants and animals? | Understand |
| **2** | a) Obtain electrostatic fields of single circuit 3-phase EHV line.<br>b) Compute the rms values of ground level e.s field of a 400 KV line at its maximum operating voltage of 420 KV (L-L) given the following details:<br>Single circuit horizontal configuration H=13 m, S=12 m, conductor 2×3.18 cm diameter, B=45.7 cm. Vary the horizontal distance along ground from the line centre from 0 to 3H. | Apply |
| **3** | a) Obtain the electrostatic fields of double circuit 3-phase EHV AC line. | Remember |
| | b) Describe the difference between primary shock current and second a hock current. | |

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| **4** | a) How does the electric field at ground level influence tower design?<br>b) Explain the effect of electric field intensity nearer to conductor surface and nearer to ground surface with respect to E.H.V. lines. | Understand |
| **5** | a) Obtain electrostatic induction on un energized circuit of double circuit EHVAC line.<br>b) A 1150 KV, Δ line has conductors at heights 26m and 44 m with 24m spacing conductor on circle of 1.2m diameter. At 1200 KV, calculate the electrostatic field at ground level at distances from the line centre d =0, 13, 26 m. | Apply |
| **6** | Explain the travelling wave concept with standing waves and natural frequencies | Understand |
| **7** | a) Explain if the Transmission line is Open-Ended and is excited when Double- exponential wave response?<br>b) What is the purpose of reflection and refraction coefficients of travelling waves and its Significance explain in detail? | Understand |
| **8** | Discuss the line energization with tapped charge voltage of travelling waves in EHV AC lines. Explain the traveling wave concept for step response of transmission line:<br>i) Losses neglected, ii) Losses and attenuation included. | Understand |
| **9** | Obtain the reflection and refraction of travelling waves. | Apply |
| **10** | A transmission line is 300 Km long and open at the far end. The attenuation of surge is 0.9 over one length of travel at light velocity. It is energized by:<br>i) A step of 1000KV and<br>ii) A sine wave of 325 kV peak when the wave is passing through its peak. Calculate and plot the open end voltage up to 20 m sec | Apply |

| **S.No** | **Question** | **Blooms Taxonomy Level** |
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| **UNIT – 5** | | |
| **PART – A (SHORT ANSWER QUESTIONS)** | | |
| **1** | Explain power circle diagram and its use | Understand |
| **2** | Discuss the voltage control using synchronous condensers. | Understand |

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| **3** | Explain the cascade connection of shunt and series compensation | Understand |
| **4** | Discuss briefly about the sub synchronous resonance in series capacitor | Understand |
| **5** | What are compensated lines? | Remember |
| **PART – B (LONGANSWER QUESTIONS)** | | |
| **1** | What is the purpose and significance of power circle diagram and its uses and also explain in detail the receiving end circle diagram for calculating reactive compensation for voltage control buses. | Understand |
| **2** | What is the purpose of synchronous condenser and how voltage profile increases using synchronous condenser also the design of the rating of the synchronous phase modifier (or condenser for short)? | Remember |
| **3** | What is the reason for the existence of SSSR in the steady state and transient? | Remember |
| **4** | Explain the voltage control using synchronous condensers. | Understand |
| **5** | Explain Shunt Reactor Compensation of Very Long Line with Intermediate Switching Station and give the Voltage and current expression at Intermediate station. | Understand |
| **6** | Find the generalized constants for transmission line with seriesCapacitor Compensation at middle of line. | Evaluate |
| **7** | What is the reason for the existence of SSSR in the steady state and transient? Conditions in series capacitor compensated lines? Explain the voltage control using synchronous condensers. | Understand |
| **8** | What is the purpose and significance of power circle diagram and its uses and also explain in detail the receiving end circle diagram for calculating reactive compensation for voltage control buses? | Understand |
| **9** | Define compensation and explain Cascade connection of components of shunt series compensation with generalized equations and chain rule? | Remember |

**MULTIPLE CHOICE QUESTIONS:**

**UNIT-1:**

1. One 1200KV line can carry as much power as _____400Kv circuits for equal distance of transmission.
2. The equivalent radius of a bundled conductor with two number of similar sub conductors each with distance 3cm and bundle spacing 12cm is _____cm.
3. Skin effect causes _____
4. The maximum number of sub conductors which has been tried on experimental basis is _____
5. The inductance of any conductor due to its internal flux is _____µH/m
6. The value of resistance _____ with increase in temperature
   a) Increases b) decreases c) increases or decreases d) does not change
7. Solar irradiation intensity is measured in _____
   a) Watt/m b) Watt/sq. m c) Watt d) Weber
8. Radiation loss is given by_____ law
   a) Maxwell's b) Stephan-Boltzmann's c) Ampere's d) Ohm's
9. The value of [L][C]= _____ for a three phase transposed line where g is velocity of light in km/sec, [U] is unit matrix
   b) (1/g) [U] b) (1/g2)[U] c) g[U] d) g2[U]
10. The capacitance of an isolated sphere is _____
    a) Directly proportional to its radius b) In directly proportional to its radius
    c) Independent of its radius d)directly proportional to square of its radius 11.

Which of the following is not the transmission voltage in America?

a) 66 kV b) l32kV c) 264 kV d) 400 kV

12. Which of the following is usually not the generating voltage?
    a) 6.6 kV b) 9.9 kV c) 11kV d) 13.2 kV
13. Boosters are basically
    a) Inductors b) Capacitors c) Transformers d) Synchronous motors.
14. Which of the following is not the distribution system normally used
    a) 3 phase-4 wire b) 3-Phase-3 wire c) 1-Phase-3 wire d) 1-Phase-4 wire.
15. Conductors for high voltage transmission lines are suspended from towers
    a) To reduce clearance from ground b) To increase clearance from ground
    c) To reduces wind & snow loads d) To take care of extension in length during summer
16. Transmission efficiency increases as
    a) Voltage and power factor both increase b) Voltage and power factor both decrease
    c) Voltage increases but PF decreases d) Voltage decreases but PF increases
17. With same maximum voltage to earth, which ac system (with P.F=0.8) will require more copper as compared to DC 2 wire system?
    a) Single phase. 2 wire (midpoint earthed) b) 1-Phase. 3 wire (neutral=1/2 outer)
    c) Three phase three wire d) Three phase-four wire (neutral = outer)
18. When alternating current passes through a conductor
    a) It remains uniformly distributed throughout the section of conductor
    b) Portion of conductor near the surface carries more current as compared to the core
    c) Portion of conductor near the surface carries less current as compared to the core
    d) Entire current passes through the core of the conductor.

19. The fact that a conductor carries more current on the surface as compared to core, is known as
    a) Skin effect b) Corona c) Permeability d) Unsymmetrical fault.
20. The effective resistance of a conductor will be the same as Ohmic resistance when
    a) Current is in true sine wave form b) Voltage is low c) Power factor is unity
    d) Current is uniformly distributed in the conductor cross-section

**UNIT-2**

1. The current drawn by the line due to corona losses is……..
2. Presence of ozone as a result of corona is harmful because……..
3. Between two supports, due to sag the conductor takes the form of……..
4. The inductance of a single phase two wire line is given by…….
5. The effect of ice deposition on conductor is…….
6. The effect of wind pressure is more predominant on……..
7. Which of the following statement is correct ……..
8. Which of the following statements is incorrect…….
9. Wooden poles for supporting transmission lines are used for voltages up to…….
10. If K is the volume of cable conductor material required to transmit power, then for the transmission of the same power, the volume of cable conductor required for single phase 2 wise AC system is……
11. Maximum permissible span for wooden poles is
    a) 10 meter b) 20 meters c) 60 meters d) 200 meters
12. When transformers or switchgears are to be installed in a transmission line, the poles used are
    a) I type b) J type c) H type d) L type
13. For improving life, steel poles are galvanized. Galvanizing is the process of applying a layer of
    a) Paint b) Varnish c) Tar coal d) Zinc.
14. The disadvantage of transmission lines as compared to cables is
    a) Exposure to lightening b) Exposure to atmospheric hazards like smoke, ice, etc,
    c) Inductive interference between power and communication circuits d) All of the above
15. ACSR conductor implies
    a) All conductors surface treated and realigned b) Aluminum conductor steel reinforced
    c) Anode current sinusoidal run d) Anodized core smooth run
16. The surge resistance of transmission lines is about
    a) 50 ohms b) 100 ohms c) 250 ohms d) 500 ohms
17. During storm the live conductor of public electric supply breaks down and touches the earth. The consequences will be
    a) Supply voltage will drop b) Supply voltage will increase
    c) Current will flow to earth d) No current will flow in the conductor
18. In transmission system a feeder feeds power to
    a) Service mains b) Generating stations c) Distributors d) all of the above
19. For transmission lines the standing wave ratio is the ratio of
    a) Maximum voltage to minimum voltage b) Maximum current to minimum voltage

c) Peak voltage to RMS voltage d) Maximum reactance to minimum reactance

20. In a transmission line following arc the distributed constants
    a) Resistance and inductance only b) Resistance, inductance and capacitance
    c) Resistance, inductance, d) Capacitance and short conductance

**UNIT-3**

1. For the same resistance of line the ratio, weight of copper conductor/ weight of aluminum conductor, is…….
2. The function of steel wire in ACSR conductor is…….
3. In high voltage transmission lines the top most conductors is……
4. For 11 kV line the inductance per km per phase will be of the order of……
5. For 11 kV. Line the capacitance per km per phase will be of the order of……
6. If 3000 kW power is to be transmitted over a distance of 30 km, the desirable transmission voltage will be…….
7. The permissible voltage variation in transmission and distribution system is……
8. The voltage of transmission can be regulated by……..
9. The most economic voltage for transmitting given power over a known distance by overhead transmission line is approximately……
10. String efficiency is given by……
11. For a 66 kV line having span of 200 meters between towers the approximate sag will be
    a) 0.02 m b) 0.2 m c) 2 m d) 20 m
12. In the above case if the span is doubled, the sag will be a) 2 m b) 4m c) 8m d) 1 m
13. The reflection coefficient for a short circuit line is a) 1 b) Zero c) 0.5 d) -1
14. In case the height of transmission tower is increased
    a) The line capacitance and inductance will not change
    b) The line capacitance will decrease but line inductance will decrease
    c) The line capacitance will decrease and line inductance will increase
    d) The line capacitance will decrease but line inductance will remain unaltered.
15. In a transmission line if booster transformers are to be used, preferred location will be
    a) At the receiving end b) At the sending end
    c) At the intermediate point d) Any-where in the line
16. A 70/6 ACSR conduction is an aluminium conductor steel reinforced, having
    a) Cross sectional area of aluminium as 70 $mm^2$ & the cross-sectional area of steel as 6 $mm^2$
    b) Cross-sectional area of steel as 70 $mm^2$ and the cross-sections area of aluminium as 6 $mm^2$
    c) 70 aluminum conductors and 6 steel conductors
    d) 80 steel conductors and 6 aluminum conductors

17. In aluminum conductors steel reinforced, the insulation between aluminium and steel conductors is
    a) Any insulator b) Bitumen c) Insulin d) No insulation is required.
18. Under no load conditions the current in a transmission line is due to
    a) Corona effects b) Capacitance of the line c) Back flow from earth d) Spinning reserve 19. Which distribution system is more reliable?
    a) Ring main system b) Tree system c) Radial system d) All are equally reliable 20. Out of the following systems of distribution, which system offers the best economy?
    a) Direct current system b) AC single phase system
    c) AC 3 Phase 3 wire system d) AC 3 Phase 4 wire system. **UNIT-4**

1. Stability of a system is not affected by……..
2. A 10 MVA generator has power factor 0.866 lagging. The reactive power produced will be…….
3. In order to increase the limit of distance of transmission line……
4. A 30 km transmission line carrying power at 33 kV is known as……
5. If K is the volume of conductor material required for 2 wire dc system with one conductor earthed, then the volume of cable conductor material required for transmission of same power in single phase 3 wire system is ……
6. The permissible voltage variable in voltage in distribution is…….
7. Surge impedance of transmission line is given by……
8. 750 kV is termed as……..
9. In case of transmission line conductors with the increase in atmospheric temperature…….
10. If the height of transmission towers is increased, which of the following parameters is likely to change.....?
11. For increasing the capacity of a transmission line to transmit power which of the following must be decreased?
    a) Voltage b) Capacitance c) Line inductance d) All of the above
12. In terms of constants A, B, C and D for short transmission lines, which of the following relation is valid?
    a) A = B = 1 b) B = D = 0 c) A = C = 1 d) C=0
13. Which of the following is reduced due to the use of bundled conductors?
    a) Capacitance of the circuit b) Inductance of the circuit
    c) Power loss due to corona d) All of the above
14. The ratio of capacitance from line to line capacitance from line to neutral is nearly
    a) 1/4 b) 1/2 c) 1 d) 2
15. Following effects are associated with transmission lines
    a) Corona effect b) Proximity effect c) Skin effect d) All the above
16. The sag of a transmission line is least affected by
    a) Self weight of conductors b) Temperature of surrounding air
    c) Current through conductor d) Ice deposited on conductor.
17. The sag of the conductors of a transmission line is 1.5 m when the span is 100 m. Now if the height of supporting towers is increased by 20%, the sag will

a) Increase by 20% b) Increase by 10% c) Reduced by 20% d) Remain unchanged

18. ACSR conductor having 7 steel stands surrounded by 25 aluminum conductor will be specified as
    a) 7/25 b 7/32 c) 25/7 d) 25/32.
19. The networks associated with transmission lines are:
    I. T-network II. Π network III. Tree net.
    A two terminal pair of network of a transmission line can be represented by
    a) I only b) II only c) Either of I or II d) Either of I, II or III 21. Which of the following relationships is not valid for short transmission lines?
    a) B = Z = C b) A = D = 1 c) $I_s = I_r$ d) None of the above. **UNIT-5**

1. Phase modifier is normally installed in the case of…….
2. 2 For complete protection of a three phase line…….
3. A single phase 400V, 50Hz, motor takes a supply current of 100A at power factor of 0.701 lag. The motor power factor has been improved to 0.9 lagging by connecting a condenser in parallel. Calculate the current through capacitor……
4. For the same voltage boost, the reactive power capacity is more for a…….
5. The reactive power flow can be controlled by installing shunt -compensating devices at……
6. The size of capacitors can be determined based on the Objective function……
7. The problem of capacitor placement can be divided in to…….
8. Electro -mechanical voltage regulators are used in…….
9. Find the reactive power supplied by the capacitor to improve the power factor of motor from …….0.65 to 0.85 lag. The motor draws 4 kW.
10. For voltage control in ac distribution system the induction regulators have the advantages of…….
11. Which of the following is a static exciter?
    a) Rotorol b) Amplidyne c) Rectifier d) Metadyne
12. Tap changing transformers are employed for
    a) Stepping down the voltage b) Stepping up the voltage
    c) Supplying low voltage current to instruments
    d) Both stepping up and stepping down the voltage
13. In tap changing transformers, the tapping's are provided on
    a) Secondary winding b) Primary winding
    c) Tertiary winding d) High voltage winding
14. The best location for use of a booster transformer in a transmission line is
    a) At the sending end b) At the receiving end
    c) At the intermediate point d) Any-where in the line
15. Line drop compensator is a
    a) Feeder b) Voltage regulator c) Distributor d) Protecting device
16. Distribution type voltage regulators are
    a) 1-Phase only b) 3-Phase only c) Both 1-Phase and 3-Phase d) 3-Phase 4 wire
17. To increase the reliability of voltage improvement type of capacitors are preferred
    a) Fixed b) Switched c) Mixed d) Static

18. Normally fixed capacitors are installed up to the KVAR of
    a) 400 b) 300 c) 600 d) 200
19. Most type of control used for the switched capacitor is
    a) Voltage control b) Current control c) Time control d) Capacitance control
20. Station type voltage regulators are
    a) 1-Phase only b) 3-Phase only c) Both 1-Phase and 3Phase d) 3-Phase 4 wire

**WEBSITES:**

1. www.sitehostplus.com/extra-high-voltage-ac-transmission/nptel.iitm.ac.in
2. http://www.electricalquizzes.com/electric-transmission-distribution/electric-transmissiondistribution-mcqs-9. ...
3. https://en.wikipedia.org/wiki/Electric_power_transmission
4. www.electrical4u.com/corona-effect-in-power-system 5. www.electricaleasy.com/2016/07/corona-discharge.html

**EXPERT DETAILS:**

1. Transmission network by Prof. Paithankar, Department of Electrical Engineering, IIT Bombay
2. Prof. S. Majhi, Department of Electrical Engineering, IIT Guwahati
3. Dr. SS Tulasi Ram, Department of Electrical Engineering, JNTUH, Hyderabad

**JOURNALS (NATIONAL & INTERNATIONAL):**

1. IEEEpower Systems Magazine
2. International Journal of power Systems,
3. Journal of power Engineering and Technology

**LIST OF TOPICS FOR STUDENT SEMINAR:**

1. Power handling capacity and line losses
2. Sequence inductances and capacitances
3. Electrostatics – field of sphere gap
4. Relation between 1-phase and 3-phase AN levels
5. Corona pulses generation
6. Calculation of electrostatic field of EHV/AC lines 7. Electromagnetic interference-Examples
8. Open circuited and short-circuited end.
9. Voltage control using synchronous condensers

**CASE STUDIES / SMALL PROJECTS**:

1. Static VAR Compensating systems
2. Lumped parameters of distributed lines

3. Cascade connection of shunt and series compensation.
4. Evaluation of Fault Analysis in Transmission Lines Using Relay Settings
5. Reactive Power Compensation in Railways Using Active Impedance Concept
6. Project on Unified Power Flow
7. New Technology for High Voltage Direct current using VSC-HVDC System
8. Electrical Transmission Lines Project on Simulation of Extra High Voltage