16. Question Bank

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QUESTION BANK

Sub Name : Transmission and Distribution **Sub Code: EE8402**

UNIT I

PART – A (Short Answers)

1.What are the various components of power supply system? (CO1)

2. Give reason why the transmission lines are three phase 3 wire circuits while distribution lines are three phase 4 wire circuits. (CO1)

3. What is meant by power supply system? (CO1)

4.Define Skin effect. (CO1)

5. What is meant by proximity effect? (CO1)

6. A three phase transmission line has its conductor at the corners of an equilateral triangle with side 3m.The dia of each conductor is 1.63 cm. Find the inductance per phase per km of the line. (CO1)

7.Define composite conductors. (CO1)

8. What is meant by proximity effect? (CO1)

9. What is meant by inductive interference? (CO1)

10. List out the advantages of double circuit lines. (CO1)

11.What is meant by transposition of the lines. (CO1)

12.Mention the advantages of bundled conductors. (CO1)

13.What is ACSR conductors? (CO1)

14.On what factors does the skin effect depends? (CO1)

15.Distinguish between GMR and GMD. (CO1)

PART – B (Long Answers)

1. From the fundamentals derive an expression for inductance of a single phase transmission system. (CO1)

2. (i) Derive the expression for the capacitance per phase of the 3 Φ double circuit line flat vertical spacing with transposition. (9) (CO1)

(ii) Why is the concept of self GMD is not applicable for capacitance? (4) (CO1)

3. Find the capacitance per km per phase of a 3Φ line arrangement in a horizontal plane spaced 8 metres apart. The height of all conductors above the earth is 13 metres. The diameter of each conductor is 2.6 cm. the line is completely transposed and takes the effect of ground into account. (CO1)

4. (i)Write a short note on the inductive interference between power and communication lines. (5) (CO1)

(ii) Find the capacitance between the conductors of a single-phase 10 km long line. The diameter of each conductor is 1.213cm. The spacing between conductors is 1.25m. Also find the capacitance of each conductor neutral. (8) (CO1)

5. Derive the expression for the capacitance of single phase transmission line. (CO1)

6. (i)A three phase O.H transmission line has its conductors arranged at the corners of an equilateral triangle of 5m side. calculate the inductance of each line conductor per Km. Given dia of each conductor is 1.547 cm.(8) (CO1)

(ii) Explain the concept of self GMD and mutual GMD for evaluating inductance of transmission lines.(5) (CO1)

7.Draw and explain the structure of modern power system with typical voltage levels . (CO1)

PART – C

1. Calculate the inductance per phase per meter for a three phase double circuit line whose phase conductors have a radius of 5.3 cm with the horizontal conductor arrangement as shown in fig. (CO1)

A B C A^1 B^1 C^1

o ← 8m →o ← 8m → o ← 8m → o ← 8m → o ← 8m → o

UNIT II

PART – A (Short Answers)

1.What is meant by Critical disruptive voltage and Visual critical voltage?

2. what do you mean by corona?

3. write the expression for propagation constant and characteristic impedance.

4 .What are the methods adopted to reduce corona?

5. Classify transmission lines based on its length. .

6. What is the use of power circle diagram?

7. Write the advantages and disadvantages of corona.

8. What are the A,B,C,D constants for long lines representation**.**

9.List out any two reasons for line loss in a transmission lines.

10.Mention the significance of surge impedance of loading.

11.Define transmission efficiency and voltage regulatuion of a transmission line.

12. What is Ferranti effect?

13. what is propagation constant?

PART – B (Long Answers)

1. Derive the expressions for sending end voltage in nominal π method and end Condenser method. (CO2)

2. (i) Derive an expression for power flow through a transmission line.(8) . (CO2)

(ii) What is corona loss? How do you determine this loss? (5) . (CO2)

3. A 220kV, 3Φ transmission line has an impedance per phase of (40+j200)Ω and an admittance of (0+j0.0015) mho. Determine the sending end voltage and sending end current when the receiving end current is 200 A at 0.95 pf lagging. Use nominal T method. . (CO2)

4. Expalin the method of drawing receiving and sending end power circle diagrams. . (CO2)

5.(i) Briefly explain about surge impedance and surge impedance loading.(5) . (CO2)

(ii)What are the steps involved in receiving end power circle diagram with neat sketch.(8) . (CO2)

6. Derive A,B,C,D constants using nominal T method and π method for med lines. . (CO2)

7. Derive the expressions for sending end voltage in nominal T method with neat phasor diagrams. . (CO2)

8.(i) What is an equivalent circuit of long line? Derive expression for parameters of this circuit in terms of line parameters. . (CO2)

9. Write a short notes on the following. . (CO2)

(i) Surge Impedance loading.

(ii) Power angle curve

(iii) lodability limits based on thermal loading

PART – C

1.Perform the analysis of long transmission lines using RIGOROUS method. . (CO2)

2. A three phase 5 km long transmission line, having resistance of 0.5 Ω / km and inductance of 1.76mH/km is delivering power at 0.8 pf lagging. The receiving end voltage is 32kV. If the supply end voltage is 33 kV, 50 Hz, find line current, regulation and efficiency of the transmission line. . (CO2)

UNIT III

PART – A (Short Answers)

1.List the characteristics which the insulators should possess. (CO3)

2. What is meant by efficiency of an insulator string? (CO3)

3. Mention the advantages of the pin type insulator. (CO3)

4. What are the main causes for failure of insulators? (CO3)

5. What are the methods for improving string efficiency? (CO3)

6. What is the effect of temperature on sag?. (CO3)

7.When the conductor is subjected to wind and ice coating what will be the resulting force on it? (CO3)

8. What is a guard ring? (CO3)

9..Define string efficiency. (CO3)

10.What is capacitance grading? (CO3)
11.Define safety factor of insulator. (CO3)
12.Why it is desired to have this value to be high? (CO3)
13.What are the properties of insulators? (CO3)
14.What is a strain insulator? (CO3)

PART – B (Long Answers)

1. Draw the schematic diagram of a pin type and suspension type insulators and explain its function. Also give the advantages of suspension type. (CO3)

2.. A 3 phase overhead transmission line is being supported by three disc insulators. The potential across top unit (i.e. near the tower) and the middle unit are 8kV and 11kV respectively. Calculate, (CO3)

a) The ratio of capacitance between pin and earth to the self capacitance of each unit

b) Line Voltage

c) String Efficiency

3. Discuss about the methods to increase the value of string efficiency, with suitable sketches. (CO3)

4. A string of 4 insulator units has a self capacitance equal to 4 times the pin to earth capacitance. Calculate,

a) Voltage distribution as a % of total voltage b) String efficiency (CO3)

5. Explain in detail about testing of insulators. (CO3)

6.An overhead transmission line at river crossing is supported from two towers at heights of 40m and 90m above water level, the horizontal distance between the towers being 400m. If the maximum allowable tension is 2000kg, find the clearance between the conductor and water at a point midway between the towers. Weight of the conductor is 1kg/m. (CO3)

7.Derive the expression for the Sag when supports are at equal levels. (CO3)

8.. Explain the non uniform voltage distribution over the insulator string. Show that the unit nearest to the conductor has the highest voltage across it. (CO3)

PART – C

1. What are the various properties of insulators? With a neat diagram, explain the strain and stray type insulators . (CO3)

2..Derive the expression for the Sag when supports are at unequal levels and also during the effect of ice and wind loading. (CO3)

UNIT IV

PART – A (Short Answers)

1. Define underground cables. (CO4)
2. What are the causes of heating in cables? (CO4)
3. What is the necessity of armour in cables? (CO4)
4. Write few commonly used materials for insulation in cables. (CO4)

5. What is bedding? (CO4)
6. Compare and contrast overhead lines and underground cables. (CO4)
7. Define thermal resistance of a cable. (CO4)
8. What are the difficulties in intersheath grading? (CO4)
9. What are screened cables? (CO4)
10. What is meant by dielectric stress in a cable? (CO4)

PART – B (Long Answers)

1. Explain any two methods of grading of cables with necessary diagrams. (CO4)
2. With neat diagram, explain the constructional features of a 3-conductor cable. (CO4)
3. Discuss about power factor and heating of cables. (CO4)
4. Derive the expression for insulator resistance, capacitance and electric stress in a single core cable. Where is the stress maximum and minimum? (CO4)
5. A single core 66kv cable working on 3-phase system has a conductor diameter of 2cm and sheath of inside diameter 5.3cm. If two inner sheaths are introduced in such a way that the stress varies between the same maximum and minimum in the three layers find: (CO4)
   a) position of inner sheaths
   b) voltage on the linear sheaths
   c) maximum and minimum stress

PART – C

1. Briefly explain about various types of cables used in underground system. (CO4)

2. Derive an expression for maximum stress in a cable by capacitance grading. Also obtain the condition of equal maximum stress of a cable with the grading of three dielectrics. (CO4)

UNIT V

PART – A (Short Answers)

1.What is UPFC? (CO5)

2. Give the comparison between D.C and A.C systems of transmission and distribution systems. (CO5)

3. List out the major FACTS devices. (CO5)

4.what is the need of an earthing system? (CO5)

5.Mention the different types of bus bar arrangements in substations? (CO5)

6.What are the types of transformer substations? (CO5)

7.Define feeders and distributors. (CO5)
8.What are the advantages of outdoor substations over indoor substations? (CO5)
9..Define Kelvins law. (CO5)

10.Mention the terminal equipments in HVDC system. (CO5)

11.What is meant by resonant grounding? (CO5)

12.whar is meant by pole mounted substations? (CO5)

13.State the advantages of EHVAC transmission system. (CO5)

14.What is meant by STATCOM? (CO5)

PART – B (Long Answers)

1. (i) Explain the design principles of substation grounding system. (8) (CO5)
   (ii) Explain the equipments in a transformer substation. (5)

2. Explain about the various types of substations . (CO5)

3.Explain the following: (CO5)

(i) Neutral grounding

(ii) Resistance grounding.

(iii) Solid grounding

4. Explain about FACTS with neat diagram. (CO5)

5. (i) Compare EHVAC and HVDC transmission.(5) (CO5)

(ii) What are the different kinds of DC links? Draw relevant diagrams.(8)

6.Give the detailed explanation about the classification of Distribution systems. (CO5)

7. Explain the different types of neutral grounding. (CO5)

8.Explain about radial and ring main and inter connected systems. (CO5)

9. Write a short notes on UPFC and SVC. (CO5)

10. Discuss about DC distribution systems fed at one end and both the ends. (CO5)

PART-C

1. Explain the advantages and disadvantages of EHVAC transmission. Also state how the problems are being used. (CO5)

2. Explain the working principle of STATCOM with a neat sketch. (CO5)

3. Explain the various techniques of voltage control and power factor improvement in distribution systems. (CO5)